Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Telephone Weekly, Telephone Magazine, Telephone Securities, The Telephone, Sound Waves
PUBLISHED WEEKLY BY TELEPHONY PUBLISHING CORPORATION,
608 S. Dearborn St., CHICAGO, Telephone Wabash 8604

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Entered as second-class matter September 4, 1908, at the postoffice at Chicago, Ill., under act of March 3, 1879.

Volume 102
Number 5

CHICAGO, SATURDAY, JANUARY 30, 1932

Subscription — 10 Cents a Copy
$3 a Year U. S., Cuba and Mexico
$4 Canada, $5 Other Countries

Some Opinions and Comments on Current Telephone Topics

One encouraging sign in the public utility situation, viewed from the national standpoint, is that there is a marked decline in the political demand for government ownership and operation. The reason is plain. The loud complaints against high taxes all over the country have jammed the emergency brake on the radical politicians who have been agitating the idea of putting government more and more into the utility business at the people's expense.

When they can't get enough tax money to run the legitimate public activities, like the schools, the fire and police departments, etc., even the politicians sense the absurdity of their trying to finance taking over the utility services.

By their good management the service companies have stood up during the depression better than other industries. Both business interests and the public will oppose placing the political blight on the utilities that have made such a good showing under private management.

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There is, of course, no hope of preventing altogether the efforts to extend the political regulation of service companies. These are being pushed at Washington from day to day, regardless of the strong feeling that the only effective way to reduce government cost is to keep government out of business enterprises.

The Federation of American Business, an organization composed of both small and big business men, has performed a notable national service by officially informing Congress that it is bringing the country to the verge of bankruptcy by its invasion of industrial fields in scores of instances.

Why a business should be taxed to enable the government to enter into competition with it is something only the radical politician can visualize—and he can't explain it to the satisfaction of the average citizen.

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In its effort to extend the regulation of service companies, Congress has now adopted a resolution for what is termed "a sweeping investigation" to ascertain the ownership and control of all public utility corporations except the railroads.

The House committee on interstate and foreign commerce is to handle the inquiry which at first was meant to deal with the vexed question of holding companies. Now it is broadened to include all facts as to ownership in all concerns that have anything to do with interstate business. This will affect telephone companies, power companies, radio systems and bus lines.

Just what legislation will develop from the gathering of this list of several million stockholders is not stated—in fact, its sponsors say they do not know—but it is expected that when they find out "who owns" there will be more regulation. Anyway, they have an appropriation of $100,000 to start with in collecting the data, and that helps some during these hard times.

In making public the names of holders of stock in utility companies, their political enemies hope to show control by Big Business and interlocking interests that have Wall Street addresses. They will also find that thousands of utility share-owners are company employes and service-users who have acquired and own small blocks of shares having no connection with Big Business whatsoever. This is likely to disappoint the political investigators.

New Business.

The first month of 1932 saw the launching of new business campaigns by many telephone companies, both large and small. Their plans contemplate the recovery of stations which were ordered out last year on account of the economic pressure and the addition of new contracts made possible by the growth of their service areas.

Until general business conditions show a tangible improvement, the work will probably be slow, but experience has shown that persistent effort on the part of employes will produce results. In every community there are families without telephone service who will buy it, once they appreciate its value.

So long as there are more domestic electric light customers than residence telephone users, and more passenger automobiles than telephones, the telephone industry cannot consider that it has finished its job in enlisting subscribers.

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In this connection the January 15 bulletin of Standard Statistics makes some in-

teresting observations. This survey records a gradual decline in the output and sales of electrical energy, with the prospect of only a seasonal rise for the first half of the current year.

Regarding the telephone situation, the bulletin says that "the excellent manner in which profits were sustained in the telephone division of the utility industry during 1931 was made possible largely by drastic cuts in operating expenses."

"Illustrating the fashion in which this was accomplished," says the bulletin, "telephone operating revenues for the 10 months ended October 31, 1931, amounted to $967,386,562, a decline of 2.3 per cent as compared with the $989,784,215 registered for the corresponding period of 1931.

"Telephone expenses during the same period, however, were reduced 4.4 per cent, or from $677,676,031 to $647,888,259, by means of cuts of 7.4 per cent in maintenance, 11 per cent in traffic expenses, 3.4 per cent in commercial expenses, and 1.7 per cent in general and miscellaneous expenses. The net result was that operating income for the period advanced 1.8 per cent, to $227,193,049."

The figures are drawn from the reports rendered to the Interstate Commerce Commission by 103 of the larger telephone companies, including 24 Bell companies and 79 locally-owned organizations.

A 1932 Forecast.

Using these figures as a basis, Standard Statistics makes this forecast for the early part of 1932:

"October results, however, which were considerably at variance with the average for the year, are more closely indicative of what is to be expected of telephone companies during the near term future. In that month, operating revenues declined 4.2 per cent and operating income 5.3 per cent, despite a continued sharp curtailment of expenses.

Itemized study reveals that subscribers' station revenues were relatively stable, but that long distance tolls dropped 10.4 per cent and that there were declines ranging from 3 per cent to 5 per cent in practically every important income item.

Like declines are expected to characterize such summaries over coming months, and we doubt that any measure of recovery will be witnessed until there is a definite upturn in business activity."

This forecast furnishes a strong argument for continued efforts in securing new business during the months to come.

COMING CONVENTIONS.

Nebraska Telephone Association, Hotel Paxton, Omaha, Neb., February 9, 10 and 11.

Iowa Independent Telephone Association, Fort Des Moines Hotel, Des Moines, February 24, 25 and 26.

Texas Independent Telephone Association, Texas Hotel, Fort Worth, March 22, 23 and 24.

South Dakota Telephone Association, Sioux Falls, April 6 and 7.

Ohio Independent Telephone Association, Deshler-Wallick Hotel, Columbus, April 12, 13 and 14.

Kansas Telephone Association, Jayhawk Hotel, Topeka, April 19, 20 and 21.

Pennsylvania State Telephone & Traffic Association, Penn-Harris Hotel, Harrisburg, May 17 ,18 and 19.

Up-State Telephone Association of New York, Jamestown Hotel, Jamestown, May 25, 26 and 27.

Some Features of Utility Regulation

A Commissioner's Personal Viewpoint of Services Performed and Attainments Desirable as Result of Relationship Between Regulatory Bodies and Utility Companies — Address Before Annual Convention of the Illinois Association

By J. Paul Kuhn,
Member, Illinois Commerce Commission

In discussing regulation we find it a matter in which not only those interested in the ownership, management and operation of public utility properties are concerned but also all those who receive or pay for any services rendered through the operation of such properties.

In my comments I wish to be understood as expressing my individual views, for the reason that the observations made by me do not in any way imply endorsement of those statements by the regulatory body of which I am a member, or of the National Association of Railroad & Utilities Commissioners in which I actively participate.

The very growth of public utilities furnished the creative force for the regulation of industries whose activities vitally touched the daily life of our people. The states of Massachusetts, Wisconsin and New York were among the first to adopt laws assuming jurisdiction over the affairs of public utilities operating within those states. At the present time every state, except one, has a commission of some character whose duty it is to stand between the utility companies and the public and see that each is justly and equitably dealt with by the other; and each has rather completely asserted its right to control utility properties within its borders, in the matter of service to be supplied to the public and the rates to be charged for that service.

Most of those states have also prescribed accounting standards to be followed, have placed restrictions upon the issuance of securities and expressed supervision over the extension, installation and withdrawal of service.

Such regulation first brought a cry from "big business," while many not financially interested felt that state interference with private business was not conducive to the best interests of the country. Later that feeling became less pronounced and the right of the state to regulate natural monopolies became more extensively recognized.

Today utilities, which were at first unfriendly to regulation, find it to be the greatest stabilizing factor in their business; and the public as a whole have come to realize that it prevents the charging of exorbitant rates or the making of excessive profits and at the same time guarantees a fair and reasonable return on investments and encourages extension of service and improvement of plant and equipment for the benefit of those served or desiring to be served.

Thus, regulation is today properly recognized as securing to all, the advantages of a monopoly and as protecting the public against its disadvantages.

The public have come to better understand that no utility can give good service unless it can show a stability and an earning power that will attract private capital, while the utilities have learned that they will not be permitted to inflate values,

water stock or render an inferior brand of service.

Utilities generally are organized and vested with certain legislative rights and privileges to supply the public with a specific commodity or service. The nature of the commodity or character of service is such that duplication or competition would necessarily result in economic waste; consequently, more or less exclusive, commonly-termed monopolistic, rights and privileges are granted the utility, and it is upon this theory of a regulated monopoly that the laws of the several states are based.

It is because of the grant of right that public utility regulation is warranted; and because of these more or less exclusive rights, the utility is charged with special duties and obligations in supplying a commodity or in rendering a service.

It is the duty of the utility, through its officers and employes:

(1) To recognize the fact that it is created by the public, as its agent, with the protected privileges of furnishing to the public a certain commodity or supplying to the public a special service.

(2) To supply the public within its territory with reasonably adequate service at a reasonable rate.

(3) To exercise such a degree of care in the management and operation of its property, and the financing of the company, as to maintain its plant and equipment on a progressive and up-to-date plane; and to conduct its business on an economic basis consistent with modern progress and good service, in keeping with the advancement of the art and science.

(4) To maintain, improve and enlarge its plant and equipment in keeping with any reasonable demand for service which may be made upon it by the public.

It is not my intention to touch upon that vast and all-important field denominated "rate making," except to say that the public have come to the understanding that it is proper, in a rate hearing, to give honest consideration to the question of whether the utility company, at its existing scale of rates and with its existing costs, can obtain sufficient revenue to promptly meet its obligations and thereby maintain its credit, and as a consequence thereof maintain its service in prime condition and readily secure new capital for service extensions.

With this understanding on the part of all, we find that regulation, as it has existed, has resulted in great benefits to the public and to the utilities. It is generally recognized that the principle of regulation is sound, although of course, being human, a regulatory body is not unlike other human enterprises and errors will sometimes be found.

This is yet a comparatively new field of endeavor and, as we gain more experience from actual, practical application of the administration of regulatory control to changing conditions, it will naturally follow that its results will be improved.

One of the difficulties encountered by a regulatory body is that an honest human error, such as none of us is free from, is much discussed by all, while the valuable and helpful service rendered receives very little, if any, comment. In this respect members of a regulatory body experience the same results from human nature as do the operators of the utility.

The utility service may be inadequate or totally suspended for but one period of ten minutes within one week. The utility, if it serves normal consumers, will receive many complaints concerning that break in service and it will be much discussed among the consumers, while it may be that no commendable discussion will be engaged in concerning the adequate service rendered during the entire remainder of the week.

We are all more or less given to that same psychological reaction in all matters; and it naturally follows that the better the service—whether it be by a utility or by any individual in his usual vocation—the error or letting down of service, by comparison, becomes more pronounced.

Each utility property of any size or importance is provided with a capable staff of trained engineers, accountants, lawyers and rate experts—specialists in the various phases of utility management and regulation—who pass upon each of its problems and the advisability of each of its policies, constantly studying its needs so that the best operating results and public relations may be obtained.

Regulation has provided, through the various divisions of the respective state commissions, a similar, well-qualified staff of technically-trained men, who render most valuable service to individuals and municipalities far in excess of what the finances of those interested parties would permit them to otherwise avail themselves of or enjoy.

With these safeguards, the regulated monopoly reduces the cost of doing business and results in the more effective conduct of that business. If the proper economic principles of operation are applied, the principle of regulated monopolies eliminates duplication of capital and of effort. It results in a reduction of overhead expenses, in production, in selling and in advertising; and such reduction in cost of maintenance and operation is reflected in a reduction in the cost of service to the consumer.

The regulatory bodies of today are called upon to be ever-mindful, however, of the tendency of some utilities to extend service into virgin territory for the primary purpose of pre-empting it and thereby holding it as against another utility engaged in a similar business and in whose territory, in the ordinary progress of things, it would naturally belong.

An extension of any kind is usually popular with the public, and an extension from which can be derived a sufficient revenue to justify the expenditure will, under normal conditions, result in lower rates to all consumers, but—except where the territory promises to show rapid advancement in the near future—the regulatory body is charged with guarding against burdening the patronage which is compensatory with the cost of rendering service to those whose business is not compensatory.

The necessity of weighing the many elements and factors, which are properly to be given legal, economic and engineering consideration, in the disposition of cases before a public utility commission, is the real basis for public utility regulatory laws.

In the telephone industry there is one important problem which furnishes considerable concern because it is contrary to the usual trend of business.

It is that an increase in the number of telephone stations being served by the utility does not produce the economies of operation which ordinarily attend an increase in the volume of business, for the reason that as a new station is installed the utility is called upon to render service to the new station and in addition thereto render increased service to each of the other stations insofar as they may desire connection with the new station. So that in the telephone industry the cost of rendering service to each unit increases as the number of units is increased.

The Spirit of Our Forefathers.

While I would not minimize present conditions, I feel very strongly that we are emphasizing too much the evil factors and that we are overlooking the great natural resources of our country and the splendid courage and enterprise of our people.

You here in central Illinois need have no fear of starvation. Many of your ancestors endured and overcame hardships and reverses much greater than any you will experience.

Therefore, I say, let us awaken in ourselves the latent spirit of our forefathers. Let us have an abiding confidence in the fundamental soundness of our American institutions, in the enduring principles of our government. Let those who are complaining of their lot here go to some other country—any other country—and see how much better off we are than the people of any other nation on earth.

Let us cease to whine about depression and devote ourselves to the diligent performance of our daily duties, confident that the day is not far off when the sun will again begin to cast its warm rays upon a happy and prosperous people.—Silas H. Strawn, President of the U. S. Chamber of Commerce, in an address at Decatur, Ill.

This unusual principle—of the increase of cost of service per units with the increase of units—does not apply to other than the telephone industry. It does not apply, of course, to the very small exchanges, and it varies in its application as the exchange increases from approximately 1,500 telephones to a larger number.

This is only a suggestion of some of the problems which are presented by regulation, and one evidence of the fact that no definite yardstick can be used in disposing of cases which come before the commission.

If legislation could be adopted in such a way as to define its subject and object—with a precision that left nothing to administrative discussion and common sense—no kind of public regulation would be necessary.

Problems of Regulatory Body.

In the operation of public utility properties the trouble comes, not from the fundamental rules as laid down, but from the practice of the utility in abusing the application of those rules. It, therefore, becomes very difficult, and borders on the impossible, to lay down hard and fast rules, concerning operation, accounting and financing, to be adhered to under all circumstances and conditions, even though in all instances there is an honest and sincere effort made to adhere to them.

But a conscientious effort on the part of the operators of utilities to adhere to the intent of the fundamental rules, as laid down, proves of material value in expediting justice and the business of the regulatory body, and ultimately to the healthy advancement of the business of the utility.

It clearly follows that in the successful operation of a public utility, it is important that its owners and operators recognize and grasp an opportunity; but it is of equal importance that they willingly forego an unfair advantage, which is clearly intended to be guarded against by the law.

The business of a utility must necessarily be based upon sound, well-established and recognized business principles, having in mind at all times those things pertaining to service, commodity furnished, courteous treatment—which will deeply impress themselves upon a consumer—and its obligation to the public which gave it its existence and which in turn is served by it.

It is, therefore, important that the idea that the memory of character of service, quality of goods and courteous dealings remains long after the price is forgotten, and by the application of that basis for existence and progress the business will prosper by a natural process. In fact, the telephone industry—being a comparatively new one when considered in connection with some other industries—has had a most phenomenal growth and for the most part under regulation.

History of Telephony.

It was on June 2, 1875, that Alexander Graham Bell invented the telephone and it was in 1876 that the first conversation was carried on over the telephone when Mr. Bell used these words: "Mr. Watson, come here; I want you." In the year 1876 there were two telephones and less than 100 feet of wire, and this equipment was in a Boston attic which was the workshop of Mr. Bell.

For a time telephones were leased in pairs and these permitted communications only between those two telephones. Then a crude switchboard was constructed to inter-connect telephones, and eight subscribers were connected by a switchboard installed at New Haven, Conn., in 1878. This, of course, was soon followed by switchboards in many other cities.

From this beginning the telephone industry expanded until on January 1, 1930, there were 32,800,000 telephones in the world, 60 per cent of which were located in the United States or approximately 20,000,000 telephones which connected more than 70,000 communities.

The revenue derived from the industry necessarily expanded in a similar proportion and increased from $86,825,500 in 1902 to $1,200,000,000 on January 1, 1930, while the investment in plant increased from $389,278,000 in 1902 to $4,200,000,000 on January 1, 1930, and today there is in the United States one telephone in use for about every six inhabitants.

Illinois Telephone Industry.

Here, within the state of Illinois, the industry has kept pace with the rapid growth throughout the United States and there are in Illinois today in excess of 1,700,000 stations, which is more than exist in the continents of Asia, Africa, South America and New Zealand.

A study of the inception of telephone industry in Illinois would indicate that the first exchange was installed in Chicago on March 18, 1878, and that the first Independent exchange was installed at Carlinville by B. M. Burke in 1893, soon following the expiration of the Bell patents.

It is rather interesting to note that in the state of Illinois—exclusive of approximately 275 mutual companies having no published rates or charges for service and paying operating expenses by assessment of its members—the total number of telephone exchanges on January 1, 1931, was 1,122; the total number of company stations was 1,748,921; and the total number of employes was approximately 37,000.

When the telephone was invented the United States was made up of thousands of cities and communities, each of which was removed from one day to seven days from the others; but with the advent of the telephone and the development of the art at the present time, those communities have all been brought within from one minute to 60 minutes of each other. Consequently it may well be said that the telephone has played an important part in bringing together these thousands of cities and communities into one large community.

Much could be said concerning the practice engaged in by lawyers and engineers who appear before the regulatory bodies representing the parties of interest.

The theory of utility regulation is a comparatively new field. A quarter of a century is a comparatively short time within which to develop new provisions, and a new standard of rules of evidence—and a new standard of evidentiary value—for that new field. Because of the inability to standardize evidence and rules of evidence in public utility regulation cases, erroneous records, due to lack of skilled legal and practical insight into the real issues of the case, sometimes result in many facts and conditions which would have a tendency to throw light upon the real subject matter, not being presented and, on the contrary, many facts and conditions which have no probative value are offered.

Presentation of Cases.

This is not criticism, but is the observation of a condition which follows as a result where a case is presented by one who has had little opportunity in a new field of practice to familiarize himself with just what elements of information are of essential importance and value.

As a result of this situation, which is unavoidable, the person or persons to whom the evidence is submitted finds a great deal of chaff in the hopper of justice; and the tribunal before which the case is pending is required to search through it in an effort to find a kernel of wheat. Sometimes the chaff becomes so confusing that the kernel of wheat is obscured or overlooked.

In presenting a case to a regulatory body today, it is a well-accepted fact that matters not directly covered by the law must be given much consideration, and that the application of principles is not a cut-and-dried legal problem.

The utility operators of the country and the lawyers representing them should, in the preparation of cases to be presented for the consideration of the respective bodies charged with the application of the laws concerning regulation in the respective states, bear in mind that the cases present many facts which cannot be solved by judge-made or legislative-made laws.

Training for Commission Work.

Some of the outstanding institutions of higher education are advocating that the lawyer should be trained in other fields of endeavor. Those schools are already participating with their medical, economics and political science staffs in an effort to break down the artificial barriers between the various fields of learning. It is to some degree recognized that "social policy" is formed largely by legislators and judges, although neither of these agencies utilize the valuable knowledge of the economist, the historian, the psychologist, the philosopher or the engineer in determining this policy.

In my opinion, more time should be

spent in the law schools in ascertaining how the law is actually working, and what inconsistencies may exist between local social standards and actual experience.

With reference to the engineer, he might well be reminded that even though he moves large objects with ease, the fact remains that public opinion is nevertheless ponderable and can, therefore, be moved only slowly and deliberately.

The telephone companies are now confronted with a situation which cannot be met by any regulatory treatment. They are in a position which they can only meet by the utmost frankness in explaining to the public the usefulness and value of their service and by exercising a degree of salesmanship which they probably have never before been called upon to do.

The average consumer—especially in the country and in the smaller cities—is, under present conditions, in no frame of mind to worry about whether or not the utility serving him is paying dividends. He is thinking about his own expenses.

He probably sympathizes with an effort to keep up good wages and keep employes working, but does not realize that he is vitally interested even in that, if he is having troubles of his own. In other words, it is natural to assume that he is thinking of himself and his own problems, and we cannot blame him for giving less consideration to the economic situation of other people.

In spite of the facts in the case, there will always be some who believe that the price of everything ought to go down, simply because they are finding it difficult to meet the general cost of living. We find those who do not go deeper in reasoning out a solution for their own economic ills than to say: "We can get along without a telephone and in that way we will save two dollars a month."

Two dollars a month looks like a small sum but it is by reducing family expenses a few cents here and a few dollars there that many people—especially the farmers—are trying to tide themselves over the present period.

It is incumbent upon the telephone companies to impress upon the subscribers on the farms and in the small cities, as well as in the larger cities, that telephone service is so imperative to their safety and comfort that, even though they are having some financial difficulty in these times, it would be poor economy to attempt to get along without the telephone.

I would suggest, therefore, that you let no opportunity pass to emphasize the ways in which service is profitable to the user; and do it by giving absolute facts in an effort to show the farmer, for example, how he can save money or make money by using the telephone.

Explain to him the opportunities it affords of reaching and securing help, such as in times of illness, or accidents, and when farm machinery is broken. Explain to him the value in life of a friendly contact with his neighbors, as well as the financial advantage of being able to keep in constant contact with the market of farm products by use of the telephone.

I wonder, too, if you in the telephone industry have been as diligent as you might be in letting the people know what you are doing for them through improvements in your art. Most everyone has read about telephone conversations being engaged in across the ocean, and this is a remarkable achievement. There are, however, many things not so spectacular but more practical in their value to the everyday telephone user which might well be emphatically impressed upon him.

While telephone service in Illinois may not be perfect, it is considerably improved from what it was a few years ago; and I wonder if you are pointing out that fact to your customers with as much emphasis as you might.

No doubt there are small telephone exchanges in Illinois which have not found it necessary or practical to make all the local improvements which the larger exchanges have put into effect, but the nature of telephone service is such that an improvement made in one place is an improvement everywhere else. For example, a rehabilitated toll line adds considerably to the quality of service to all other exchanges within a wide radius; and this process is going on constantly, raising the general level of the service throughout the state and throughout the country.

Public uilities are permitted—and in fact I believe are required according to the intent of the law—to maintain their plants in good operating condition at all times and provide for its replacement when worn out. This must be done from current revenues, and I believe is sound management and in the best interests of the public.

The regulatory commission can require the companies to maintain their plants in good condition, but the companies must themselves make the facts about their business known by being fair with their subscribers as well as with the municipalities in which they do business, so that their customers who are entitled to know about the business may have all of the facts and in all respects be advised as to what the company is doing.

Constant contact with men enthusiastically interested in the telephone industry has established in my mind that a large number is possessed with a patriotic duty and responsibility in the rendering of public utility service. I wish that the people of this land could more fully understand how much true and loyal patriotism and how much interested devotion to the highest interests of the country, are found existing in that type of man, many of whom compose a part of this organization.

Both from the standpoint of the utility, and from the standpoint of the public, the regulatory bodies are called upon to bear in mind that ordinarily very little regard is given to the individual who goes down on a prominent street corner and drops a plugged nickel in a peanut machine, and then complains because he does not receive 5 cents worth of peanuts.

And from the standpoint of a public utility, it should thoroughly understand the customs of the trade, have a full knowledge of the arts and sciences involved, and possess reasonable ability to weigh all facts of every kind, nature and description, and to dissect and analyze them—irrespective of whether those facts may be offered and presented by representatives of the utility, representatives of the regulatory body, or by the public who are not expected ordinarily to be as well informed—and having fully considered all of these matters, work out a plan whereby the consumer may receive the greatest possible service, consistent with the rates charged and consistent with what the traffic will bear.

I have said that it is important for better operation and regulation to come as near as possible to having a proper and ideal blending of the legal and the engineering rules to be applied.

The successful and well-regulated public utility, to one occupying the position of a member of a regulatory body, very frequently takes on the aspect of a three-legged stool; leg No. 1 representing the individuals who have capital invested in the utility property; leg No. 2 representing the operators, including engineers engaged in the rendering of service; and leg No. 3 representing the public, or such part of the public as are users of the service offered.

It is rather a homely example, but my observation has been that if one will set before him a three-legged stool and concentrate all of his attention upon one of the three legs, it will appear to him that the other two legs are engaged in throwing all of the weight possible over onto

Autocrats Are Not Tolerated in Modern Business.

There are plenty of men in the United States who have the capacity to become the "strong leaders" of history. But to be such they must have power, autocratic or tyrannical power. Uneducated peoples that cannot attend to their own affairs must have such leaders. Educated people do not need them and will not tolerate them.

Forty years ago there may have been an idea that our people would like such leaders in industry, but the course of events since then has made it as clear as a summer sky that the atmosphere of the United States is as bad for the autocrat in industry as for the autocrat in politics.—Walter S. Gifford, president, American Telephone & Telegraph Co.

the leg upon which he is concentrating. If he will then look at leg No. 2 or leg No. 3, as the case may be, and concentrate entirely upon that one, it will again look as though the other two legs were forcing the weight of the entire structure over onto that one.

It not infrequently happens that the individuals represented in this homely example seem to so concentrate all of their attention upon the leg which represents that part of the structure which they are, that they lose sight of the importance of the other two legs; while it is the task of the commission or regulatory body to give full thought, consideration and weight to each of the legs supporting the structure, with the full knowledge that one or two of the legs supporting the structure could not possibly exist, nor would the structure stand, without the cooperation and support of the third.

Regulation, valuable as it has unquestionably been, both to the utilities and to the public, will be valuable in the future only as it actively and comprehensively reflects conditions which exist. I believe public utility operators recognize this fact, and I believe they ought to put this recognition of fact into effect by supporting all wise and well-directed efforts to bring laws into conformity with present conditions.

I further believe that the public utility industries might properly support even stronger regulatory commissions, better staffed and better equipped financially to do the job committed to them. There can result from wise, able, expert regulation by state commissions, made up of men who understand their subject, nothing but benefit for both the public and the utilities.

Industries such as those represented here, whose annual requirements for additional capital and whose volume of business are both measured in billions of dollars, and which for all practical purposes are compelled to constantly expand, cannot fail to be concerned with the exercise of governmental control over the marketing of their stock and bonds, which is in a great measure stabilized by the regulatory monopolistic character given to the utility.

It can well be said, and substantiated by facts, that regulation of utilities has proved to be a real value to the public, and regulatory bodies are a continuing legislature in the respective states, with special jurisdiction.

The growth and power of a great public utility is, ordinarily, beyond the understanding of one who has not made a special study of it, and a lack of understanding often leads to distrust. The telephone industry, however, as a whole, has enjoyed the confidence of its patrons. You have won that confidence largely through service and customer-ownership, and for that reason are, in general, well entrenched in the good wishes of your patrons.

It is important to continue the spirit of good-will which now exists. This can be largely brought about by continued good service and constant improvement in both service and economies of operation so far, of course, as such economies are consistent with adequate service.

I hope that my belief is well-founded, that the utility companies generally will continue to show the same intense initiative and performance in public service which has characterized them in the past.

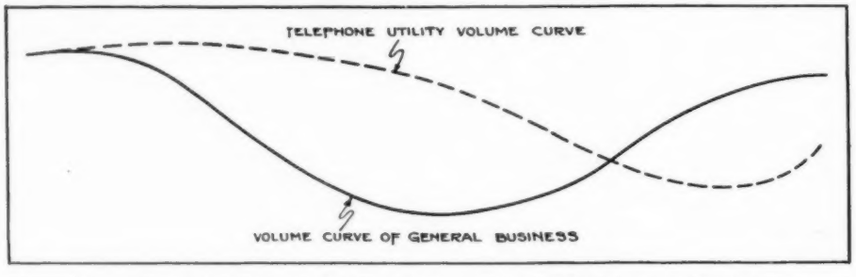
You have assumed the responsibility of supplying the American public with the best possible service at the lowest cost consistent with good operation and good credit standing of the industry. And I believe that I am well-founded in the further thought that the American people will support and sustain public utility industries in fulfilling this duty so long as actual performance and service continues to measure up to this responsibility.

Telephone Companies Must Sell Service

More Strenuous Efforts Required to Sell Telephone Service and Facilities in Next Few Months to Prevent Telephone Volume From Dropping as the General Business Volume Increases—Detailed List of Various Salable Items

By George A. Scoville

The "Telephone" volume curve lags behind the "General Business" volume curve and this lag is from 6 to 18 months, as is shown in the accompanying diagram. The "General Business" volume curve dropped quite rapidly, has reached the bottom and is slowly starting upward, in my judgment. The "Telephone" volume curve is just really commencing to feel the results of the general business conditions. This is easily explained because the telephone is one of the last things that will be given up.



Curves Showing How Telephone Volume Lags Behind General Business.

The telephone industry has, in spots, worked diligently to keep its volume up. Nearly every attempt has succeeded, and some companies have even increased their volumes. This has been accomplished by strenuous and intelligent merchandising efforts.

Regardless of whether or not telephone companies do continue the application of aggressive selling efforts, the telephone volume will not drop as much as the general business curve. However, the telephone volume curve is now dropping and will continue to drop, even after the general business curve has started upward, unless strenuous sales efforts are continually applied.

If there ever were a period when aggressive selling tactics and campaigns were essential for the telephone industry, it will

Unless Conditions Change, Mr. Scoville Is of the Opinion That the Telephone Volume Curve Will Drop Considerably. If, However, Strenuous Sales Effort Is Made by Every Telephone Company, He Believes This Condition Can Be Reversed.

be during the first half of the year 1932, because we are now experiencing the full effects of the depression as an industry.

The telephone business is about the best business in all the world. Let's keep it that way! The telephone volume curve can be pushed upward more readily than the general business curve. To accomplish this, telephone companies must keep on with their sales activities, selling the various classes of service which they are able to supply. The commercial department has many types of service to sell or rent.

A list which you can adjust to fit your own conditions is given on this page.

Illinois Southeastern Employes Provided Group Insurance.

In order to combat the fear and worry of employes over uncertainty of the future, the Illinois Southeastern Telephone Co., which serves 30 Illinois towns, has bought $325,000 of group life insurance for the benefit of its 250 workers. The worker who has made adequate provision for his family and his own future certainly has a big load off his mind.

The sale of such a large amount of insurance at this particular time is one of the encouraging indications that business is going on as usual in conservatively-managed concerns. The psychological effect on the morale of the telephone people involved is further favorably increased because the company is paying a large part of the premium for this form of protection.

President R. A. Lumpkin of the Illinois Southeastern Telephone Co. states that employes whose wage is less than $150 a month will be entitled to receive an insurance policy of $1,000. Those with salaries of $150 to $249 a month will be entitled to a policy of $2,000. Those who have salaries of $250 or over will be entitled to a policy of $2,500. After five (5) years of continuous service the insurance will increase $100 per year to a maximum of $500.

The cost of the insurance is greater than the small contribution made each month by the employe. The telephone company pays the additional cost as well as pays the cost of administration, collection and accounting for the insurance plan.

Group insurance purchased by telephone companies promotes a friendly feeling within the organization. The telephone subscribers are directly benefited from the resulting increased efficiency of the organization.

Pennsylvania Convention to Be Held at Harrisburg in May.

The Pennsylvania State Telephone & Traffic Association, of which H. E. Bradley, Harrisburg, is president, will hold its annual convention at the Penn-Harris Hotel in Harrisburg, May 17, 18 and 19. Everyone who attended last year's notable convention will want to attend again as this year's meeting is expected to outdo all former efforts. More will be said later.

List of Services Salable by Telephone Companies.

Advertising—
- Directory.
- Classified directory.
- Classified index.

Amplifier service—
- Public gatherings, fairs, Chautauquas, schools, hospitals, skating rinks, etc.

Amplifying sets—
- For the partially deaf.

Apartment house service—
- Vestibules.
- Apartments.
- Janitors.
- Door-openers.

Bank vault special lines—
- Emergency service in connection with holdups.
- Safety telephones in vaults.

Battery feed trunks—
- For the operation of privately-owned equipment on subscribers' premises, P. B. X's, intercommunicating systems, burglar alarm, thermostats, buzzer systems, etc.

Bells—
- Small extension bells.
- Large extension bells.
- Extension bells, or signals, under relay control.

Booths—
- For long-distance users.
- For noisy locations.

Burglar alarm service—
- Banks, insurance offices, stores, residences, etc.

Buzzers—
- Push button and buzzer wiring.

Code-calling systems—
- Paging systems (audible radio type).
- Code signal sending set, including signal control relay set.
- Indoor signals—Horns, bells, special gongs.
- Outdoor signals—Horns, bells, for P. B. X. and intercommunication installations in factories, department stores, hospitals, etc.

Coin-box service—
- Public pay stations.

Cordless type switchboard—
- For small P. B. X. installations.

Credit bureau switchboards.

Directory listings—
- Extra names.
- Extra listings.
- Night and Sunday listings.
- Classified listings:
  - National advertising.
  - Local advertising.

Elevator telephones—
- For starters.
- For cars.

Extension telephones—
- Business.
- Residence.
- P. B. X.
- Intercommunication telephones.

Extension talking sets only—
- Desk.
- Wall.
- Hand set.

Extra length cords—
- For special telephone installations.

Fire alarm services—
- Alarm boxes.
- Sprinkler alarm circuits.
- Group ringing and common talking on firemen's lines.

Hand set telephones—
- Standard black finish.
- Standard colors finish.
- Special colors finish.

Holdup alarm systems—
- Banks.
- Insurance offices.
- Stores.
- Cafes, etc.

Intercommunicating systems—
- With trunk service.
- Without trunk service.

Jack and plug equipment—
- Surface mounting jacks.
- Flush mounting jacks.
- Portable instruments.

Keys, switching—
- For switching a telephone to either of two lines.
- For switching a telephone to one of three lines.

Key cabinets—
- With lamp signals.
- Without lamp signals.

Leased wire service—
- To Bell, Western Union, or Postal.
- To brokerage houses, banks, manufacturing concerns, dairy companies, seed warehouses, power companies, etc.
- To local broadcasting stations.

Long distance trunk lines—
- Direct lines to toll board for heavy toll users.

Message registers—
- In connection with measured service lines.

Messenger service.

Operators' breast-plate telephone sets—
- For heavy traffic lines, newspaper offices, department store, order departments, etc.

Order, table type switchboards—
- Grocery stores, markets, etc.

Order, turret type switchboards—
- Taxicab offices, credit bureaus, etc.

Outdoor telephone sets—
- Police.
- "Way side" service.
- Sheriff telephones, etc.
- Taxicab.
- Golf courses, etc.

Paging systems (radio)—
- Hotels, barber shops, billiard parlors, skating rinks, garages, clubs, bus depots, taxi stands, hospitals.

Program service (radio), locally-installed amplifiers—
- For public schools.
- For parochial schools.
- For public and private institutions, hospitals, sanitariums.
- Dance halls.
- Skating rinks, etc.

P. B. X. switchboards—
- For factories, schools, hospitals, etc.

Push button and buzzer service—
- Offices, schools, taxicab stands, etc.

Receivers—
- Extra watchcase receiver.
- Extra headband receiver, single.
- Extra headband receiver, double.

Reservoir tell-tale circuits and equipment—
- For pumping plants, public or private.

Secretarial service—
- Doctors, undertakers, etc.

Special finish telephones.

Special trunk lines and equipment for telephone solicitation campaigns.

Special arrangements for reversed toll charges.

Switching keys—
- See keys, switching.

Telektor systems (remote control radio systems)—
- For homes, clubs, schools, hospitals, etc.

Telegraph loops—
- Leased wire service by Western Union, Postal, Bell, or another telephone company.
- Printer telegraph service to newspapers.

Teletypewriter service—
- A. T. & T., Bell, Western Union, Postal.
- Page type machines:
  - Receiving only.
  - Sending only.
  - Sending and receiving.
- Tape type machines:
  - Receiving only.
  - Sending only.
  - Sending and receiving.

Transmitter cut-outs—
- For desk telephones.

Vault telephones—
- See bank vault special lines.

Visual signals indicating incoming calls—Continuous, non-continuous.

Wiring plans—
- Building cabling.
- Building wiring.
- Building terminals.
- Underground entrance leads.
- Business.
- Residence.

Outside Plant Men Talk Things Over

"I Wonder Why" of an Observing, Traveling Telephone Engineer.

By Ray Blain.

I wonder why so many telephone companies are so careless about the condition of the belts their linemen use?

The other day I saw a lineman working with a belt which resembled a stretched dish rag.

While it is true that a line belt, or safety, rarely breaks in service there is a point where they have outlived their usefulness, and to use them longer means a serious risk.

One lineman told me that his belt had been tested recently on a 500-pound pull. I would not care to use an old belt which had been subjected to such a test, for there is a probability that the test pull weakened it to such an extent that it would break later on a pull of a much less amount.

Even though an old belt is strong, it may be stretched and made so small that a lineman cannot work in it with any degree of comfort. A belt cutting a man's middle is just no fun. The stretch of the tool loops does not generally equal the stretch of the belt which makes it difficult to get tools in and out of them.

Linemen's belts of today have so many improvements over the type of a few years ago that in many cases it proves a real economy to discard the old in favor of the new designed with a view of both comfort and safety.

Experimental Plots of Telephone Poles Maintained.

Telephone poles are being subjected to weathering tests in order to obtain scientific and accurate knowledge about their proper use. Three experimental plots are maintained by the Bell Telephone Laboratories for this purpose; one is near Limon, Colo., another at Gulfport, Miss., and the third is at Chester, N. J.

In these plots, poles of short length, much like fence posts but having the usual diameter of telephone poles, are set out in orderly rows. Before they are put into the ground, practically all are treated with preservatives to resist the decay of wood. There are various kinds of preservatives used, consisting of coal-tar distillates and other chemical compounds. The problem of the telephone engineer is to find out which one of these is the best for the particular conditions encountered.

One type of preservative may be more effective than another in warm, humid atmospheres, and an entirely different kind superior in a dry climate. Or in certain climates the difference in decay resistance of certain preservatives may be so slight that it would prove wiser to use the less effective one because of its much lower cost. Other climates or other soils might make it imperative to use the first preservative regardless of its greater price.

These are among the problems that these strange-appearing test plots help to decide. There is also the matter of the different woods for telephone poles. Southern yellow pine, chestnut, cedar, and lodgepole pine are all used, and each has its advantages under certain conditions.

A longer life is given to telephone poles by the use of the preservatives. The engineers at the test plot demonstrate this by showing the difference in poles, both cut from the same log and set out at the same time, one of which has been given a preservative treatment while the other has not.

Cable Splicer's Helper Hurt in Accident on Winter Day.

By An Old Cable Splicer

In the old days it was always the lot of the cableman to have a bunch of trouble to clear on rainy days and I lived in a state famous for its winter rains. Cablemen have a reputation of having bad dispositions. If this is true, no doubt working in cold winter rains has something to do with it.

I well remember reporting to the office one rainy, windy, winter morning, only to be informed by the wire chief that we had a 100-pair cable wet and that I should get out on it immediately. I hooked up a tone test set and started out with my helper, climbing alternate poles and listening with an exploring coil. One of the drop wagon men followed hauling our tools.

We soon located our trouble at a break in the sheath about one-half mile from the office and directly in front of a fire station. The drop wagon man unloaded our tools and returned to the storeroom. The helper and I hung the platform and rigged up a canvas to provide as much shelter as possible from the wind and rain. I commenced cutting a section of sheath from the cable while the splicer started the furnace and put the paraffin on to heat. I heard the furnace start to roar as I worked away on the sheath and after a few moments shouted to my helper to send up the "soup" as soon as it was hot enough.

After waiting a few moments and not hearing anything from my "grunt," I looked down to see what he was doing. He was not in sight. I saw the kettle starting to smoke and yelled a few times without result, so dedicated a few new words to all helpers in general. My oration was cut suddenly short by the paraffin catching fire and, as is its usual custom, it made a lively blaze. I slid down the handline and kicked the blazing kettle into the street. A few passersby started to yell, "Fire!"

Firemen rushed out of the fire station with a hand chemical and extinguished the blaze. Then they wanted to know where I came from, saying they had just picked up a telephone man who had received a rap on the head. They told me that a doctor was working on him inside the station and the police were on their way out to try and locate the person who did the deed. The helper soon regained consciousness but was unable to give any clues as to what happened.

I finally came to the conclusion that the eight-inch pliers, which I had used to hammer the chipping knife to open the cable and then laid on the platform, had been accidently kicked into space by me, falling on the helper's head and knocking him out. The firemen happened to see him but in the excitement of picking him up did not notice that I was working on a platform above.

I had the helper loaded into an ambulance and started for the hospital. After explaining everything to the police, firemen, newspaper reporters, the boss and curious onlookers, another helper sent out by the office arrived and I completed the job without further difficulty.

The helper was out of the hospital in a few days seemingly all right, but I do not think he ever fully recovered, for he kept at the helping job until finally they gave him a kit of tools and dubbed him a full-fledged splicer. I understand that even now he never walks under a cableman's platform. One can hardly blame him for that.

"A Little Review of a Few Things We've Studied."

By Jake the Lineman

Mornin' buddies! This week we're gonna take time out an' review a few of the signals we've been practicin' fer the past eight weeks an' see jist how much we've really learnt.

Before I start pourin' the questions to you, I'm gonna tell you a joke I heard the other day. A little feller, whom we shall call Mickey, came home from school red-eyed and sniffing.

"You've been licked!" exclaimed his mother.

"No, I ain't, Mom," explained Mickey. "There was a doctor at the school today an' he examined us an' he said I had adnoids."

"What's thim?" demanded his mother.

"They're things in my head what's got ter be taken out."

"It's a doity lie!" his mother exclaimed angrily. "Ivry Saturday night I've combed

yer head an' nivir an adnoid did I find!"

Well, buddies, that was a case of a mother bein' misinformed as to what adnoids really are. "Ole Jake" is gonna comb yer head an' make sure that you ain't misinformed about the safe way of doin' yer job. An' if I find any ideas which are 'rong, I'm gonna yank 'em right out.

Got the ole pipes a'smokin'? All right, let's start an' find out jist what we know:

1. When should a feller wear his goggles?
2. Which way should yer cut when yer usin' a knife?
3. What precautions should you take when yer goin' up er down a ladder?
4. How many men should be allowed to work on a ladder?
5. Should yer face an' eyes be kept on a level with yer work? Why?
6. What should yer do if a kid hitches a ride onto yer truck?
7. When should the brakes on yer truck be tested?
8. What should be done to a ladle before you put in it hot solder?
9. How much would yer be worth to yer company with an' eye, arm, er leg gone?
10. Why should broken insulators be cleaned up an' not left lyin' on the ground?
11. Why shouldn't holes be punched in yer safety strap er body belt?
12. What should be done to old pole holes?
13. Why should hot pots of solder er paraffin be carefully guarded?
14. What is the "First Aid Treatment" fer solder burns?
15. Should iodine er cotton be placed on a burn?
16. If the fuse don't explode the dynamite, should yer go over an relight it? What is the safest procedure?
17. When should tools be inspected fer defects? What should be done with the defective ones?
18. Why is it necessary to inspect yer body regularly if you want to be a safe worker?
19. If you don't know the safe way, what should you do?
20. What should be used to ride strand in? Why not somthin' else?

Guess that's about enuf questions, fer if you know the correct answers to the 20 questions I jist gave you, that means that "Ole Man Accident" is outta luck if he tries to score with any one of them.

Now, I'd like fer you to do somethin' fer "Ole Jake." When I prepared this list of questions, I also prepared the answers to them an' I'd like fer you to send yer answers in to me. I'll grade them an' send you back a copy of the correct answers. Fair enuf, isn't it, buddy? All right, send yer answers in to me along with a stamped envelope an' I'll grade yer paper, clip a correct copy of the answers to it, an' send 'em back to you.

We've got a few minutes left an' I'm jist gonna talk them away.

Some fellers think it's impossible to shove "Ole Man Accident" off of this earth. Remember what Napoleon once said: "Impossible? Then it shall be done!"

That's the attitude I want you to take an' then jist watch the results. People have said things were impossible before, and later were astounded when the impossible happened.

They laughed at Lord Kelvin when he proposed to send messages under the Atlantic. When the cable was laid, who got the horse laugh?

Ford, Bell, Edison, Wright, Fulton, and a host of others were laughed at, but the same people who laughed were among those who acclaimed them later.

Of course, doin' the impossible is impossible, but who is goin' to label a thing impossible? Anything is possible that ought to be. Days without "Accidents" ought to be, an' it's up to you an' me to do our part to cut the terrible cost of "Accidents" out of the world's budget.

Well, I gotta' be goin' but I'll be back next Saturday, an' I want to see all of you out fer practice. An', by the way, don't fergit to send me your answers in care of TELEPHONY. So long!

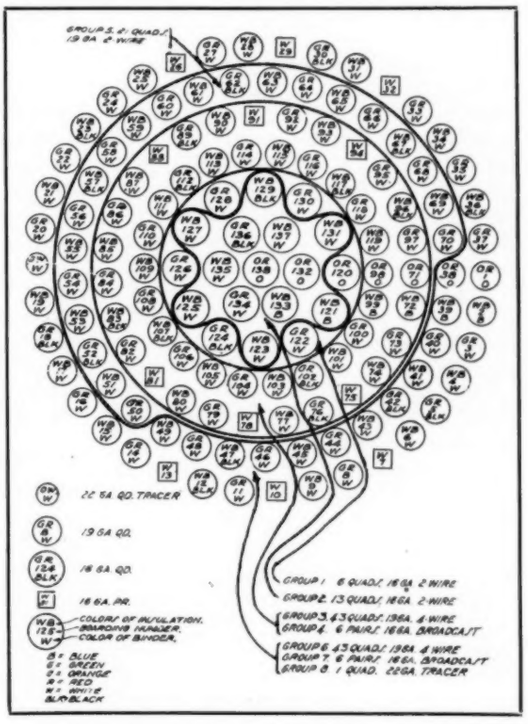
Long Toll Cables Carefully Manufactured and Installed.

Elaborate precautions are being taken in modern toll cables to reduce cross-talk between pairs and to reduce the picking up of noises from outside sources. In the manufacture, various groups of wires are carefully separated. In the splicing, special attention is given to transpositions to equalize or compensate for circuit inequalities.

An example of the grouping is shown in the accompanying illustration, which shows a typical cross section of the toll cable recently installed by the Pacific Telephone & Telegraph Co. between San Francisco and Los Angeles, Calif. The various circuit groups are kept separate, each group retaining its identity throughout each repeater section.

It may be seen that the four-wire group transmitting in one direction (Group 6) is kept apart as much as possible from the four-wire group transmitting in the other direction (Group 3). The broadcast pairs are located in the four-wire group transmitting in the same direction in which they are used.

In this cable spirally-wrapped paper-insulated wires are twisted together to form pairs. These in turn are twisted together in groups of two pairs to form quads. The quad is the unit dealt with when it is desired to use phantomed operation to enable three voice paths to be derived from two pairs of wires. The twisted-pair and quad arrangement provides the initial transposing between circuits.


GROUP 5 4 QUADS 19 GA 2 WIRE
22 GA QD. TRACER
19 GA QD.
16 GA. QD.
16 GA. PR.
COLORS OF INSULATION
BRANDING HANGER
COLOR OF BINDER
B = BLUE
G = GREEN
O = ORANGE
R = RED
W = WHITE
BLK=BLACK
GROUP 1 6 QUADS 16 GA 2 WIRE
GROUP 2 13 QUADS 16 GA 2-WIRE
GROUP 3 4 3 QUADS 13 GA 4 WIRE
GROUP 4 6 PAIRS 16 GA BROADCAST
GROUP 6 4 3 QUADS 13 GA 4 WIRE
GROUP 7 6 PAIRS 16 GA BROADCAST
GROUP 8 1 QUAD 22 GA TRACER

A Typical Cross-Section of Toll Cable Installed Between Fresno and Los Angeles, Calif., Showing Grouping of Wires.

In manufacturing the cable, three regular types of quads are made, each differing from the other by the length required for the pair-twists, and by the length of a twist when pairs are formed into quads.

To avoid the possibility of two quads in adjacent layers continuing beside each other for any particular distance, alternate layers are stranded in opposite directions during manufacture. The exact relationship between the layers shown in the diagram is true only at exceptional points.

Special attention to splicing technique and splice transpositions tends to equalize or compensate for various circuit inequalities, cutting down cross-talk. To further reduce cross-talk between two-wire circuits, at each repeater point the cross-connections are so arranged that while the phantom circuits are connected straight through, the side circuits are systematically re-arranged among the quads.

For the four-wire circuits a similar procedure is followed at the repeater offices which are located at the ends of circuit units. It should be noted that all these efforts to reduce the cross-talk do not result in its entire elimination, but serve to reduce it to within an acceptable limit.

Sales Suggestions For Small Exchanges

Gong Installed on Public Pole and Operated by Code Ringing, Locates Subscribers "Around Town" Such as Doctor, Police, Etc.—Pay Stations Placed in Public Places Solve Small Town Problem—Value of Advertising in Directory

By J. F. Brady

Somebody recently remarked that the telephone is the most economical, but motoring is the most popular. One reason why the automobile is the most popular is that the owner feels he can go "just anywhere"; whereas some places and, therefore, some people are inaccessible by telephone.

When there is a pronounced demand for such places, it is a handicap to the telephone company to be unable to supply service. Places and persons, called frequently by other subscribers, might be termed leads, or high points, in influencing prospects to patronize the service.

Lodge rooms, bus and railroad stations, hospitals, prominently located filling stations, etc., are a few such places.

Each small town exchange has its own peculiar problem, but as a rule it usually requires a united request by the public to induce some of these places to have telephones. Of course, the person in charge may not want to have service, for outward calls, so it is possible to offer inward service.

The major points of interest to a resident subscriber are quick contact with the doctor, ability to make appointments with the dentist, emergency calls to the garage and the usual calls to the druggist, grocer and market.

Probably the most valuable issue, to build up a reputation for giving service, is to locate the doctor. He usually has a telephone both in his house and office, but is frequently located through the courtesy of the druggist.

It has been a study with our company as to how to overcome the inability of being able to locate people, whose usual location is somewhere "around town." In the most prominent part of town, we have a gong, installed on a pole, and by code ringing, we call whom we want, such as the doctor, police, or subscribers who are in the habit of receiving many inward toll calls, while around town. If a vacant circuit is not available, we use our own pay-station circuit.

In some exchanges these constantly-repeated calls are disposed of by ringing "near bys." Personally I am much opposed to this practice. Even if it is good policy to locate somebody, like the doctor, for a good subscriber, it is not wise to spoil the good effects of the service by bothering some other good subscriber.

In some public places, where nobody in particular is interested in paying for outward service, it may be good policy to install a pay station. Two or more pay stations might be installed on the same circuit.

These prominent places are usually taken care of, or lost sight of, in the multiplicity of other places that may be used, in the larger towns. It is the village and small town that need a development of primary leads or outlets, to hold the bulk of the trade. How often is the small-town operator asked if the calling party can get in touch with Mr. Jones in the lodge room, or if the ice cream parlor downstairs has a public telephone? Incidently, this pay station will be used often when there is a gathering at the lodge rooms. Mr. Jones can call out.

Of course, the primary thought is to sell service directly, if it will stay sold. Sometimes the druggist will prefer inward service out in front, and a party line in the rear to call out. Or he will use the pay station occasionally, if you can relieve him of the nuisance of having certain other people continually using his telephone.

Sometimes a hidden switch, in the generator circuit, will be appreciated by the subscriber. He does not like to tell the public not to use the telephone—and neither do you—in these small towns where everybody is personally acquainted. However, if the instrument is a little difficult to operate, many of these social calls will cease and the important calls will pass over to the pay station.

I consider it the duty of the telephone company to reduce to a minimum the annoyance experienced by subscribers from outsiders. In fact, it is intelligent selfishness; in reality an integral part of the service. And, on the other hand, it is not good policy to tell people that they should not use other people's telephones, except in aggravated instances, even though they are non-subscribers.

The basic thought in using the telephone is to get in communication with somebody else, and the problem of giving this service and, incidently getting paid for it, will have to be solved by the operating company involved. Certain signals and public stations located to meet the demands of various localities, will partially relieve the strain.

Where a crowd of customers want to reach a common point, and its availability serves to satisfy such a group, facilities out of the ordinary should be considered.

Outward, resident, party-line service may be considered, if the use of such services may induce a party to change to two-way service later. I have heard of this being described as "kitchen service" and, of course, it is not listed in the directory. I would not recommend this idea, except where conditions are ideal. However, plans we may not consider practical today may prove to be valuable tomorrow. Let us study undeveloped situations.

One way is to allow your subscribers to "sample" the more desirable types of service. If you have an idle circuit available, it may not be amiss to slip the cut-in over on that line and allow one of your party-line subscribers to try it out a few days.

To make a long story short, we doubled the income of one exchange in two years by this stunt. If you are looking at some nice fresh apples at your grocer's and hesitate about buying, the grocer often tells you to "try one." If you are considering a new type of car or truck, you are immediately given a demonstration. If you have two grounded rural lines, running parallel for quite a distance, it may pay you to demonstrate the innumerable, better qualities of a metallic circuit.

Hold the "good will" and trade of your best customers. If some of those short, grounded lines are noisy, reroute them and get away from that "juice." Some subscribers will pay more for a metalic circuit, and the small added cost is forgotten in the relief of getting better service.

Crosstalk from the most commonly used circuits can be cut down by making them metallic, and it usually requires only a few spans of wire. If you cannot keep clear of those tall trees out on Main street, drop down the pole and pass through the lower limbs, sideways, with tree wire or twisted pair. There is no necessity of trying to climb over an obstruction that you can crawl under.

Probably the most constant and unobtrusive way of reminding your customers of the utility of the telephone is to advertise in your own directory, just as we endeavor to induce others to do.

A telephone directory, especially in a small town, is, to my way of thinking, the most effective way for anybody to adver-

Making Good Requires "Time."

The successful salesman gives his job a break; he puts in at least eight hours a day. Making your time valuable is only a habit after all.

Any man can make good if he wants to and is willing to pay the price, and every man has the price—more hours.
—"Fuller World."

tise. Right now, a new, up-to-date list will be appreciated and can be typed and mimeographed for about a dollar. In distributing it, talk about how nice it is to have an advertisement in it. Feel out the sentiment of the public, and if prospects look good why "go to it."

Never mind about the typed list you have distributed. You have your customers aroused about having their advertisement in the telephone book; so hit while the iron is hot, even though the first effort hardly pays for the printing. Is not the printer one of your customers? If he is not, now is a good time to do a little trading with him.

Publishing a list of new subscribers occasionally in the weekly paper counts, and it is real news.

I know of one small town directory the advertising in which was built up until it was considered for its size the best paying in several states.

One subscriber who saw the merit of the advertisement grumbled at the price. He was surprised when I told him it, in reality, was not going to cost him anything. When asked why, I said, "Well, I am going to buy a suit of clothes somewhere, but the fellow who sells it is going to, figuratively speaking, scratch my back first."

I bought the suit and got the contract too, and the customer was twice satisfied. The telephone manager should study advertising. Sample advertisements from big directories will help formulate a copy. Talk it over with the printer and get busy.

Excellent Program Being Prepared for Nebraska Convention.

Secretary George M. Kloidy has completed, save for a few small details, the program for the 33rd annual convention of the Nebraska Telephone Association, to be held in Omaha at the Hotel Paxton on February 9, 10 and 11. The forenoon of the first day will be devoted to registration and visiting exhibits. President G. E. Becker of Pawnee City will preside at the meetings.

Mayor Metcalfe of Omaha is to make the speech of welcome, with President Becker responding. Following this will be the reception of reports of the various officers and the committees. Then comes what Secretary Kloidy insists will be the most attractive feature to working managers, a talk and demonstration by H. H. Carll of Des Moines, Iowa, on how inductive interference from power lines can be reduced or entirely eliminated.

The demonstration equipment consists of miniature power and telephone lines, built parallel, and associated apparatus. The power line is connected to a bank of transformers and the telephone line through an amplifier to a loudspeaker so that the hum induced in the telephone line by the nearness of the power line can be plainly heard. Practically all of the effects of inductive interference will be reproduced, and then the way to remedy the situation graphically shown. Stereopticon slides are used to make the demonstration thoroughly understandable.

In the evening of the first day C. R. Moore of the Bell Telephone Laboratories, New York City, will give an illustrated talk on "Outside Development Work."

The second day, Wednesday, will consist of addresses from headliners. Following the annual address of the president, H. B. Porter, plant extension engineer of the Northwestern Bell Telephone Co., will discuss a question of prime importance, "Should Plant Improvements Be Made Now?" Other addresses in the morning session will be by Fred Coulson, secretary and assistant general manager of the United Telephone Co. of Abilene, Kans., on "Publicity and Public Relations," and by Glenn E. Eastburn, commissioner of the Omaha Chamber of Commerce on "The Economic Situation."

Miss Anne Barnes, traveling chief operator of the Iowa Independent Telephone Association, will be the first speaker in the afternoon, discussing "What Do You Know About Your Operating Room Management?" J. H. Agee, general manager of the Lincoln Telephone & Telegraph Co., will lead the discussion on a question of pressing importance to telephone companies everywhere presenting "The Rural Subscriber Problem."

W. H. Buckingham, tax commissioner of the Northwestern Bell Telephone Co. of Omaha, will discuss methods of making tax returns, and indicate the proper way to do this.

In the evening the annual banquet will be held. The program is purely entertainment in character and will be followed by dancing.

The concluding session Thursday morning will be opened up to various subjects of importance, reports of the committees on resolutions and nominations, and unfinished business generally.

Mr. Kloidy unhesitatingly pronounces the program the strongest the association has presented in years. Special entertainment provided for the women attending the convention will be an added attraction.

What Operators Want to Know

Many Good Ideas Originate in Small Exchanges—Profitable Use of Questions and Answers—Helpful Suggestions for Use of Questions and Answers Are Welcome—31st Installment

By Mrs. Mayme Workman,
Traffic Supervisor, Illinois Telephone Association, Springfield, Ill.

While visiting a number of exchanges in the northern part of Illinois several weeks ago, I was pleased to find all of the chief operators in these exchanges making use of the questions and answers appearing in Telephony each week.

It was interesting to hear the comments regarding them. One chief operator said, "That is the first thing the girls look for when the magazine arrives." Another said, "We find so many answers in the question and answer series to questions that come up in our office."

Some of their ideas for making use of them were exceptionally good. Would you like to hear about them?

Several of the chief operators were posting the questions and answers on the bulletin board each week so that all of the operators might study them.

In one exchange the chief operator has an hour study period each day, usually during the afternoon when traffic is light. She uses the questions and answers as a part of this study period.

In one of our smaller exchanges I found a real idea. Isn't it surprising how many good thoughts originate in the small exchange? In this particular office the chief operator makes typewritten copies of the questions and gives each operator a copy to study. Later she has a written examination and grades their papers. She then posts the correct answers on the bulletin board. Isn't this a clever wrinkle?

As we have told you before, all of the questions appearing under this heading each week are questions that have been asked by telephone operators in Illinois at our district meeting and state convention traffic schools. So it is not surprising to find that these same questions have come up in other exchanges.

What are you doing with the questions and answers? If you have some good ideas for making use of them, send them to the editor of Telephony, or to the writer, and we shall be glad to pass your suggestion on, so that others may profit too.

Questions from Illinois Operators.

1. When an operator receives a report of "All trunks busy," what action should she take?
2. Should we ask a pay station customer if he wants to be told when his three minutes are up?
3. Is it necessary to use a "split" connection on a pay station call?
4. When a subscriber at a tributary office hangs up after being asked to hold the line, why should it be the operator's error?
5. Should the toll operator announce her station name to the called station?

For answers to these questions from real Illinois operators, turn to page 34.

Time; Some Man-Made Timing Devices

Since World Began, Man Has Been Creating Timing Devices in Effort to Keep a Check on Passage of Precious Hours—History of Time Pieces Given at Traffic Conference During Annual Convention of the Illinois Telephone Association

By Miss Anne Barnes,

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa.

"I haven't the time." How often we hear that expression. How often we use it ourselves.

Who is it who has more time than I, you, or anyone else in the world, rich or poor, has ever had? Whether we work, play, or sleep, until we pass on, we all have 24 hours in every day we live. Yes, we have that time all right.

Borrowing Tomorrow's Minutes.

So, if we find our time runs out before we get things done that we should do, the reason is likely that our plan or set-up for the day is poorly organized. Sometimes, we lay out too much for one day, but usually, don't you think, the reason we run short of time is that we organize our efforts so poorly that many precious minutes are wasted? Sometimes, we put off until tomorrow what we might have done today—borrow tomorrow's minutes for today's work.

There might be some excuse for our poor use of time if we had no way of knowing the time of day as was the case of some of our ancestors. Man has always sensed the need of knowing the time of day. His early timing devices make very interesting reading.

Away back in the misty beginning of the world, time was, even before man came to live on the face of the earth. Not time as we reckon it. Man knew nothing of seconds, minutes, hours, days, months and years. He knew only of two divisions of time—day and night. That was all he needed to know for awhile. The rest came later when his mind sought out the means by which to measure his movements. It has ever been thus with man.

The Dawn of an Idea.

Back in the vague, shadowy dawn of the world squatted the cave man before the opening of his cave. What need had he for knowledge of passing time? He never ventured far from his cave except in search of food. Food, and self-protection from prowling wild animals were likely the most that he thought about. He acted from instinct and impulse, for the most part, even as the wild animals, except for the tiny spark of human intellect which made him different. As time went on his slow-thinking began to quicken. He became not only able to start things, but to finish them, however crudely.

Perhaps shadows on rocks first puzzled him as he watched them slowly changing position when the sun was shining. But the sun was not always shining and then there were no shadows. Perhaps, on one of those dark days his attention was directed to grass burning. As he watched it burn he noted that it was not as reliable as the shadows on the rocks, because spurts and gusts of wind made it burn faster at times. "When the shadow on the rock reaches that point, or the fire reaches that bush, I will go here or yon," he probably thought. But when the day was dark, or the wind was lusty, he couldn't depend on the shadow or the fire.

One day he fashioned the most reliable timepiece that a cave man ever had. The burning grass gave him the idea. He braided grass into a long rope, knotting it at certain intervals, and hung it in his cave to dry. When it was ready for use, he dampened it, lighted it at one end and then watched the slowly creeping spark mark the passage of time. Then he thought, "When the spark reaches that knot, I will go here, or yon."

The First Timepiece.

Knotted grass was the first timepiece made by man. Crude? Yes, but it served its purpose. A similar device was used by primitive people in China and Japan. They used a lighted wick two feet long, treated in such a manner as to cause it to smoulder without breaking into flame. The wick was also knotted. I should like to see one of those wicks, wouldn't you? In a certain museum in Paris, one of them may be seen. Make a note of this if you are interested and expect to go that far from home.

We must not think that ancient people were all ignorant. Indeed, many of them were great students and very learned. History records that back in 3800 B. C., the Chaldean and Babylonian astronomers had long studied the heavens. Perhaps, more particularly because they did not possess all the heaven-searching equipment which our modern astronomers have.

At any rate they knew of the sun's daily motion, and many other wonderful things about the sky. In fact, we were able to trace back to the ancient Babylonians the subdivision of day into 24 parts, the hours into minutes, and the minutes into seconds. It may interest you to know that they chose the number 60 because it is the smallest number that can be divided by so many other numbers.

Some authorities ascribe the invention of the sun dial to one of these Babylonian astrologers about 640 B. C. Greece also claims the invention. However, if you who are Bible readers and anyone else who is interested, will turn to the book of Isaiah, chapter 38, verse 8, you will read what is said to be the first authentic mention of the sun dial, in 742 B. C.: "The shadow shall return ten degrees backward in the great Dial of Ahaz."

This sun dial was composed of a shaft projecting upward from a circular base. The rim of the base was spaced off into irregular divisions each one marked with Chaldean numerals. History does not record whether there are any of these ancient sun dials preserved.

Ancient Water Clocks.

The first ancient historical record of a water clock was in the year 2556 B. C. The invention, such as it was, was attributed to a Chinese emperor known as the Yellow Emperor. Anyone might have invented it, as it was a pierced cocoanut shell placed in a bowl of water.

There were many other kinds of water clocks invented later, some of which were quite elaborate and of delicate workmanship. In the 4th century B. C. water clocks were introduced into Greece. We are told that there are portions of two ancient Egyptian water clocks, one bearing the name of Alexander the Great, and the other the name of his son, in the British Museum. These water clocks were otherwise known as "water thief" because the slow escape of water marked the passage of time.

Rome had her first water clock in 157 B. C. Previous to that time public criers kept the citizens advised of the time.

Among the spoils that Pompey the Great brought back to Rome from the far East was a valuable water clock. This he set up in the forum for the purpose of limiting the speeches of Roman orators. A good idea, was it not?

Magnificent Workmanship.

History records another bit of very interesting information about a magnificent water clock of bronze, inlaid with gold and of very cunning workmanship. It was presented by Haroun al Raschid, caliph of Bagdad in 807 A. D., to Charlemagne, Emperor of Rome and king of the Franks, in an exchange of royal gifts. It was known as the Persian water clock. Frankish records record it thus:

"The dial was composed of 12 small doors, representing the hours. Each door opened at the hour it pictured, and out of it came the same number of little balls, which fell one by one at equal intervals of

time, on a bronze drum or gong. It announced the hour to the eye by the number of doors; to the ear by the stroke of the gong. When it was 12 o'clock, 12 miniature horsemen rode forth and shut all the doors."

At this point, let me tell you about the sand glass, as Charlemagne gave one in exchange, to the Persian caliph. The sand glass came first into use in the 4th century B. C., according to very early records of desert countries in the East. Owing to a scarcity of water, sand was used, instead.

The gift Charlemagne made to the Persian caliph was known as "Charlemagne's 12-Hour Sand Glass." The glass was immense in size, and had the hours marked on the outside. It was so large that it required turning once only in 12 hours. It was very skillfully constructed. Instead of using sand, black marble was ground very fine and smooth, then boiled in wine, carefully dried and ground again. This same process was repeated nine times.

There is a very interesting bit of history about King Alfred the Great of England and his time candle. A few years before his death about 900 A. D., this truly great king pledged half of his time to God. Such a pledge meant more, indeed, than giving half an idle king's time, much of which no doubt was a great bore to king folks of olden days. Because King Alfred knew the value of time, he made this valuable contribution to God. But how was he to fulfill his vow, when he had no means of checking time in his clockless age? Truly, necessity has always been the mother of invention.

One can imagine him sitting there on his throne amidst a brilliant array of lighted candlesticks—thinking, thinking. Probably, as he watched the candles gradually growing shorter and shorter, the time candle idea came to him. We can imagine him calling for men qualified to carry out his plan for a time candle.

The plan was this: Six candles, each of them exactly 12 inches in length and notched precisely one inch apart; each one to burn from notch to notch at one-third hour intervals; one candle following another at four-hour intervals from sunrise to sunrise.

But the great king noticed that, owing to the flickering of the candles in the draft, the time varied. Being a king noted for accuracy and precision, and having made such a great pledge, he was determined to have a more accurate timing device. And so he did some more pondering. The result of this pondering was a lantern made of white horn, scraped so thin that it was transparent, to protect the time candle from drafts.

The word "clock" is mentioned the first time in history about 996 A. D.—Gehrhart's clock. Between that time and the 14th century A. D., according to history there were many wonderful clocks invented. I should like to tell you about some of their interesting history but will have time for only two.

One of these famous clocks is the great Rouen clock. Its dial is as tall as a man. It was erected in Rouen, France, by Johan de Felans in 1389 A. D. From its position at one end of the oldest street in Rouen, it has looked down upon some of the world's greatest tragedies. One of these tragedies was the burning of Joan of Arc at the stake five centuries ago. Its great bell rang the curfew on that terrible night, even as it does down to this day. In fact,

"It Has Been Said That in a Five-Minute Conversation Over the Telephone Today, the Equivalent of Half a Column in a Daily Newspaper May Be Said Easily and Without Repetition," Said Miss Barnes, in Discussing Time.

this great old Rouen clock, with its six-foot diameter dial, is still the official timepiece of that historic city.

The other clock was called the "Table Clock." It came into use about 1500 A. D. The reason it seems important to me is that people no longer had to run down to within seeing distance of a cathedral tower clock to learn the time of day. Think what the coming of the table clock must have meant to folks who lived quite a distance from the cathedral, to know what time it was. I wonder, sometimes, if we half appreciate our blessings.

"If folks can have clocks in their homes, why not have them made so that they can be carried about on their persons," someone may have suggested. At any rate, one Peter Henlein, a young locksmith of Nuremberg, is accredited with giving to the world the first watch, just four years after the advent of the table clock. This watch, as it soon came to be called, since watchmen first carried watches, was made of iron, drum-shaped, and about the size of an ordinary saucer. It must have been some pocketful. However, watchmen usually had them swung from their belts. The name of the first watch was called "Henlein's watch."

I wonder how many folks here, men and women, are wearing wrist watches? Queen Elizabeth of England, probably wore the first wrist watch. It was presented to her as a New Year's gift about 1571 A. D. It was called "Elizabeth's Bracelet Watch," and is described in history as: "A richly-jeweled armlet having in the enclosing thereof, a clocke."

A young man named Galileo stood in an ancient cathedral at Pisa, Italy, one day back in 1581 A. D., watching a massive bronze lamp up in the dome swinging to and fro, as thousands of folks had watched it before him. He noticed this: No matter how much its swing varied in distance, it always took the same time to complete it. Thus, young Galileo discovered the law of the pendulum. His habit of observing, even in very small matters, gave to humanity one of its most valuable contributions, although it remained only a suggestion for a full half a century before it was actually applied.

A hopelessly blind old man of 75, sat in his workshop day after day, thinking, thinking out a practical way to use the law of the pendulum in clockwork. It was thus that Milton found Galileo one day in 1638 A. D. dictating to his son the practical application to clockwork of the discovery he had made in his youth.

When one makes such a fine invaluable contribution to the world, as did Galileo, it seems indeed sad that he could not live long enough to see it put into practical effect. What he wanted to give to the world, out of his discovery of the law of the pendulum, was, the pendulum balance —better known to us as the balance wheel —which today is found in every watch and clock. This little balance wheel is the prime factor in the precision of all timepieces.

But Galileo passed on at the age of 78, a blind, broken, ill old man, leaving his unfinished work to be carried on, confident to the very last swing of his life's pendulum, that his dream would some day be realized—through another. But what mattered that, if it were only realized.

One can imagine clockmakers pondering and pondering over Galileo's problem, most of them finally discarding it as a crazy man's vagary. But not Dr. Robert Hooke of England. That little clockmaker never gave up until he was able to sucessfully apply Galileo's pendulum idea to clocks; and then he worked in a feverish excitement trying to apply the same principle to watches. He would almost grasp the idea but it would fail him when trying it out. The thing that eluded him was the right kind of a spring.

I think the little doctor must have been somewhat of a problem to his family during those feverish days of pondering, searching, and experimenting. How the

(*Please turn to page* 40.)

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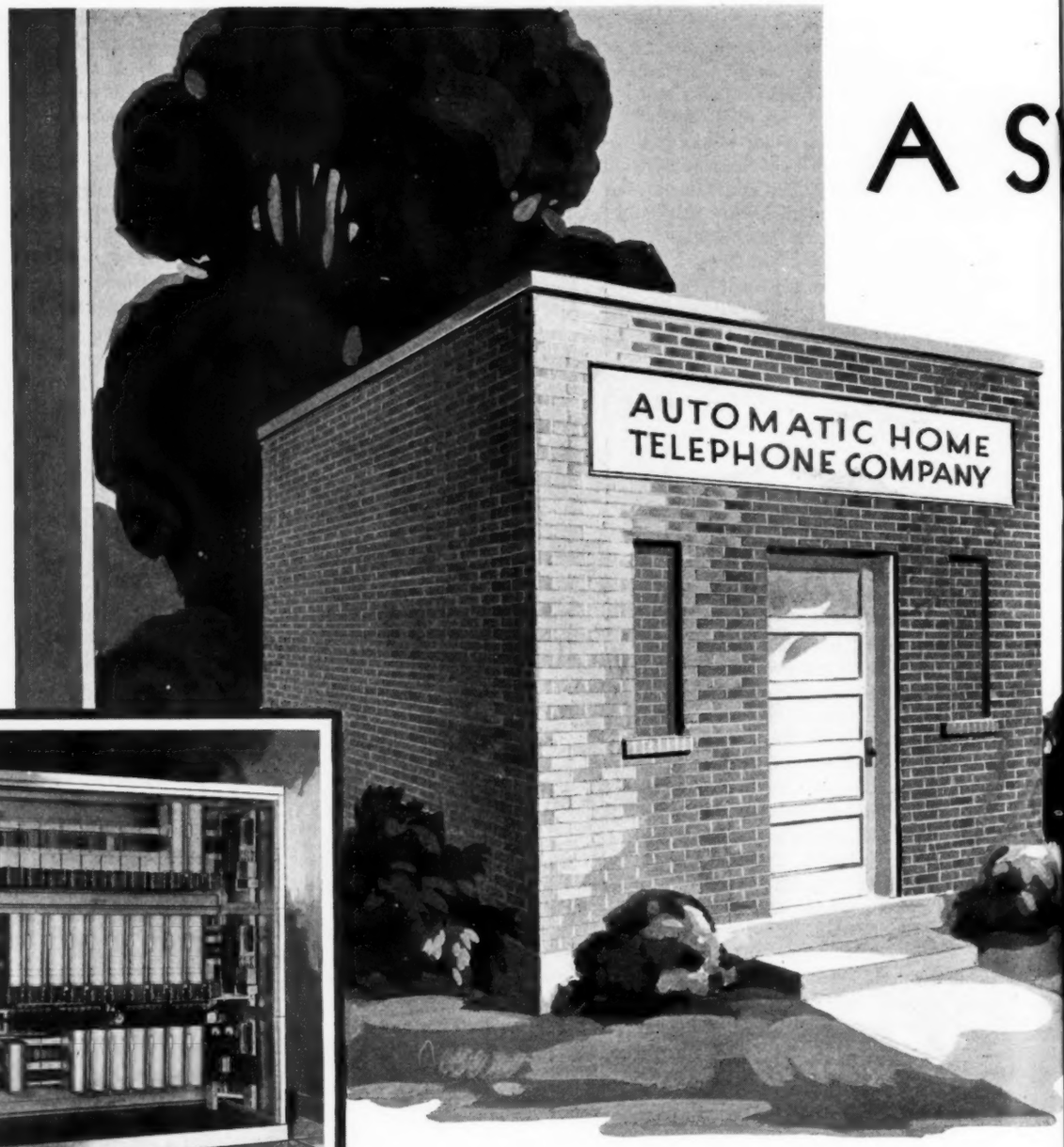

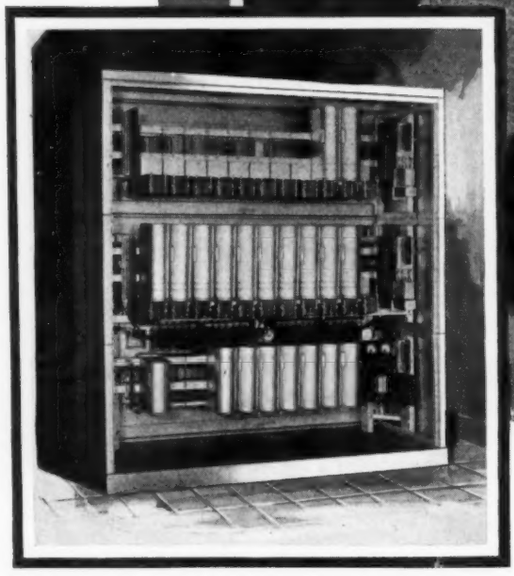

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Construction Plans of Bell for 1932

Expenditures of Bell Companies for Improvements in Facilities to Be Close to Average for Previous Years—New Construction and General Improvements in Outside Plant Included in Plans to Meet Future Needs of the Industry

Construction Budget of Bell Company of Pennsylvania for 1932.

The Bell Telephone Co. of Pennsylvania will spend $25,500,000 for new construction and service betterment during 1932, according to budget figures made public by Leonard H. Kinnard, president. During the last two years, the company has invested $70,000,000 in new construction and improving present facilities.

The 1932 expenditure will bring the total for three years up to $95,500,000. In Philadelphia the company will spend $8,500,000 on new construction. This represents only a slight variation from the investment made in new in Philadelphia last year.

President Kinnard pointed out that expenses attendant on operation of the business throughout Pennsylvania this year will total approximately $42,000,000. When this is added to the $25,500,000 for new construction it means that $67,500,000 will be spent for new construction and operation.

Construction Program of Chesapeake & Potomac Company.

Plans for expanding the telephone system serving the District of Columbia, Maryland, Virginia and West Virginia in 1932 were announced recently by Lloyd B. Wilson, president of the Chesapeake & Potomac Telephone Co. They call for expenditures of approximately $16,000,000 for additions and betterments, which is about $2,500,000 in excess of the 1931 construction projects.

Under this program the company estimates that there will be a net gain of 32,000 telephones, as contrasted with approximately 22,500 in 1931. In securing this net gain it is estimated that 198,500 telephones will be installed and 166,500 removed from service. There are now 673,359 telephones in service in this territory.

Telephone users in this area, it is estimated, will make 1,165,000,000 calls during the year, which will be an increase of 5 per cent over those made in 1931.

Expenditures for additional facilities in the District of Columbia are expected to total $4,900,000 for 1932. It is estimated that 54,000 telephones will be installed during the year and 44,000 telephones removed, resulting in a net gain of 10,000 telephones, which will mean 188,480 telephones in service at the end of 1932.

Major construction projects contemplated include $2,250,000 for telephones and private branch exchange equipment on the subscriber's premises; $1,500,000 for central office equipment; $900,000 for outside plant; and $250,000 for land and buildings.

The construction program in Maryland, it is estimated, will necessitate expenditures of $4,450,000. It is expected that 56,000 telephones will be installed during the year and 47,000 telephones removed, resulting in a net gain of 9,000 telephones, which will mean 231,016 telephones in service at the end of 1932.

Major construction projects throughout the state include outside plant extensions consisting of underground conduit and cable, pole lines, and wire, $2,150,000; telephones and private branch exchange equipment on the subscribers' premises, $1,800,000; central office equipment, $450,000; and land and buildings, $50,000.

Additions and betterments to the telephone system in Virginia are estimated to involve expenditures of $4,250,000. It is estimated that 53,000 telephones will be installed during the year and 44,000 telephones removed, resulting in a net gain of 9,000 telephones, which will mean 165,092 telephones in service at the end of 1932.

Major construction projects contemplated throughout the state include outside plant extensions consisting of underground conduit and cable, pole lines and wire, $1,750,000; telephones and private branch exchange equipment on the subscribers' premises, $1,250,000; central office equipment, $950,000; and land and buildings, $300,000.

In West Virginia capital expenditures of $2,400,000 are contemplated for new plant and equipment to provide facilities for telephone growth in 1932. It is estimated that 35,500 telephones will be installed during the year and 31,500 telephones removed, resulting in a net gain of 4,000 telephones, which will mean 120,771 telephones in service at the end of the year.

Major expenditures for new plant include telephones and private branch exchange equipment on the subscribers' premises, $950,000; construction of underground conduit and cable, pole lines and wire in the several sections of the state, $900,000; central office equipment additions, $400,000; and land and buildings, $150,000.

Bell to Spend Two Million in Nebraska and South Dakota.

Nearly two million dollars will be spent by the Northwestern Bell Telephone Co. for replacements and additions to property during 1932, in Nebraska and South Dakota. The budget calls for $1,912,000, and covers expenditures of all kinds. It includes material and work on local and long distance lines, central office equipment, purchase of land, erection of telephone buildings and other improvements.

Two of the larger job schedules are the erection of a building in Norfolk, Neb., which has been growing in importance as a toll center, and for the completion of the telephone exchange in Yankton, S. D.

On long distance lines the work will include resetting of poles weakened by insect fungus growth, woodpeckers, and animal and plant attacks, and to make permanent the temporary work put in place to take care of service during winter sleet and snowstorms. A conservative program of new line building will be followed, being limited to service demands that warrant such expenditures.

Bell Program of Construction and Reconstruction in Iowa.

The Northwestern Bell Telephone Co. will spend about $4,100,000 in Iowa during 1932 for telephone improvements, extensions and replacements throughout the state, according to H. G. Conger, general manager. This expenditure is largely for reconstruction work and does not all represent investment for additional property.

The expenditure for 1932 is comparable to the yearly average for the past five years, Mr. Conger explained, and involves a construction program providing for continued improvement in both local and long distance telephone service. The foregoing figure does not include an expense of approximately $2,200,000 which will be spent in the repair and day-to-day maintenance of existing telephone facilities.

The work in the 1932 construction program will provide improvements which will benefit generally all sections of the state, Mr. Conger says. Of outstanding importance are projects at Des Moines, Iowa City, Sioux City, Mason City and Spencer. With the exception of the Des Moines dial conversion program which will be started this year, all of this construction is now under way but will require the greater part of the year for completion.

General improvement of long distance facilities will be continued throughout this year. Additional telephone repeaters will be installed at cable repeater stations and at other long distance switching points in the state.

Telephone line construction during the year will require for new plant and replacement of existing property 34,000 poles, 370,000 pounds of copper wire on open wire lines and 196 million feet of copper wire in telephone cable.

The planned improvements for long distance lines will be made in preparation for the handling of about 13 million long dis-

tance calls during the next year. It is estimated that the daily average of local calls in the state for the coming year will exceed 1,400,000.

Pacific Bell to Spend About $35,000,000 in Construction.

President H. D. Pillsbury of the Pacific Telephone & Telegraph Co., in a letter to stockholders, announces that construction expenditures for additions and betterments during 1931 were $35,000,000. It is estimated that Pacific Telephone and Telegraph Co. will expend about the same amount on new construction in 1932.

Commenting upon construction expenditures in 1931, Mr. Pillsbury said:

"The company has filled the construction gap caused by retarded telephone growth by proceeding with extensions predicated on sound engineering and economic premises, and which are supported by forecasts of future business trends.

In total, about $10,000,000 of construction has been so advanced by the company. This advancement of construction, which includes new and replacement projects, is a program dedicated not only to sound economic considerations, but to the telephone company's playing its full part to help in this time of slackened employment.

By this means and also by spreading work among employes under reduced time schedules, we have been able to keep on the payroll an average of 1,500 employes per month more than the volume of business alone would justify."

Theory Underlying Construction Program of New York Company.

Continuing throughout 1931 its program of construction and improvement, the New York Telephone Co., according to a review issued by President J. S. McCulloh, spent approximately $85,000,000 during the year for plant additions, betterments and replacements in its service territory, comprising the state of New York and Greenwich, Conn. About three-quarters of this sum was expended in New York City.

The total expended in 1931 by the company exceeds the annual average expended for these purposes in the last five years, which amounted during that period to nearly $417,000,000.

"We are expected at all times to furnish service adequate to meet every public demand," Mr. McCulloh states. "In good times these demands rise quickly to high peaks; they must be met promptly. At all times there is a substantial movement of subscribers from one location to another, requiring expenditures for rearrangements, extensions and replacements. Because of the long periods required to engineer, manufacture and install equipment, we must take the 'long look ahead' and prepare to meet the most probable future conditions.

"To promote employment and to keep our trained forces profitably employed, it has been and will continue to be the policy of this company to carry on currently all construction and other work which properly can be so carried on. Where a force surplus exists, work is being divided among all the employes on an equitable basis. Our employes are loyally cooperating in this practice.

Fixed charges—that is, taxes, maintenance, depreciation and payment for the use of money invested in the property—constitute about three-fifths of the expense of operating the company's plant. These charges are fundamental costs associated with the operation of a telephone system, and are not susceptible to material change in either prosperous or adverse times. Although each expenditure for telephone plant increases our fixed charges, these expenditures must continuously be made, and the added expense must be borne by the company during periods of lessened telephone usage as well as during periods of greater usage.

With such preparation for the future, the company contributes to, and assures itself of sharing in, the renewal of economic growth throughout the territory it serves."

The telephones served by the company numbered about 2,601,000 at the close of the year, approximately 926,000 of these being in Manhattan and 1,757,000 in the city as a whole. Mr. McCulloh points out that a net loss in 1931 of about 21,600 telephones, resulting from the unfavorable conditions, represented a decrease of less than 1 per cent, and that the present total in the company's territory is some 130,000 higher than at the beginning of 1929 and about 430,000 above five years ago.

Bell Company of Canada Announces 1932 Construction Plans.

President C. F. Sise of the Bell Telephone Co. of Canada has announced that the gross expenditures for telephone plant additions and replacements during 1932 in Ontario and Quebec where the company operates, will total upwards of 15½ millions of dollars.

In his official statement Mr. Sise draws attention to the fact that during the past five years gross additions to plant by the Bell company of Canada, operating in those two provinces only, have averaged more than $23,000,000 annually.

"This period," he said, "it should be remembered, included some years of almost unexampled business expansion, and our big outlay to meet demands for both local and long distance service has served to put our property into substantially better physical condition than at any other time in the company's history.

"In 1932, while the outlay for extensions and replacements will be below the average of recent years, it will involve a good-sized job covering many parts of Ontario and Quebec."

The steady program of conversion from manual to dial service will be continued during the ensuing year in such larger centers as Montreal, Toronto, Quebec City, Hamilton, London and the border cities. New exchanges are in prospect at Montreal and Toronto, and much preparatory work in this connection is planned for 1932.

Major construction projects on long distance lines include the erection of pole lines and both aerial and underground cable placements between Montreal and the United States boundary, near Hemmingford, Quebec, between Toronto and Willowdale, Ontario and between Beamsville and Niagara Falls in the Niagara peninsula. Another important cable job will lead toward the completion of the Toronto-Kitchener link of the Toronto-London cable. The London-Kitchener stretch was completed last fall.

Eighty additional repeaters are scheduled for installation at Toronto in connection with long distance channels running into the United States over the Toronto, Ontario-Buffalo, N. Y., route. Seventy more repeaters will be placed in the new repeater station at Hornby, near Milton, Ontario. At Toronto, Hamilton and Oshawa, repeater installations of a particular type are planned during the year, in connection with telephone channels to be used for the transmission of radio programs.

Winter Olympic Events to Be Broadcast for First Time.

The Northern New York Telephone Corp., and the Bell System with which it connects, are cooperating in providing telephone facilities which will keep the world in close contact with the third Olympic winter games to be held at Lake Placid, N. Y., February 4 to 13.

Extensive hook-ups are planned by the big broadcasting companies so that listeners-in abroad as well as in this country can follow the progress made by their athletic representatives. A group of expert sport announcers will describe with vivid realism the breath-taking jumps and thrilling races over the Adirondack ice and snow. It will be the first broadcast of this sort ever made of the Olympic Winter Games.

For weeks the telephone men have been busy constructing special lines from the established telephone routes to the scene of the games. The bobsled run, which is about seven miles from Lake Placid, and the ski jump, which is about three miles out of the town, are among the points which will be connected by special lines.

Wherever the spectators assemble for a contest, there will be installed loudspeaking telephones, whereby all the important announcements concerning the event will be heard clearly by everyone. Additional coin-box telephones will also be installed at many points, including the arena, the stadium and elsewhere, for the convenience of the public.

Here and There in Telephone Work

The Private Branch Exchange Current Supply; Dry Cells.

By JOHN A. BRACKEN.

Manganese-dioxide cells—more commonly known as "dry cells"—are often used to supply electric current in private branch exchange practice and greatly differ from the lead type of storage cells. The dry cell has been defined as a voltaic type of a cell which being sealed is, in reality, always wet; whereas the type of cell known as wet, being open to the air, often becomes dry.

In the commercial type of dry cell, the anode (negative pole) is a containing vessel of sheet zinc. The cathode (positive pole) is a rod of carbon held in a porous mass of absorbent active material which is packed closely around it. Several thicknesses of unglazed paper keep the active material away from the zinc. The cell is hermetically (air-tight) sealed to prevent evaporation of the electrolyte.

By means of chemical testing apparatus some of the constituents of the dry cell may be easily determined. From a cell whose bottom has been removed, some of the active material is scraped from between the zinc wall and the carbon rod and placed on filter paper in a funnel, and the funnel rested in the ring of a ring-stand above a test tube.

A test tube of water is then poured over the material in the funnel and allowed to filter into another test tube below. Some of the filtered liquid from the test tube is poured onto a watch glass, and the liquid evaporated by gently heating the watch glass over a Bunsen burner.

The substance obtained is largely ammonium chloride (sal ammoniac), the electrolyte or active material in the cell, mixed with some zinc chloride. The black undissolved material on the filter paper consists chiefly of ground carbon, which improves the conductivity of the cell, and manganese dioxide which serves as the depolarizing agent. The depolarizer is needed that the cell may continue to generate electric current.

The chemical action in the dry cell is somewhat complicated, but briefly it is due to the effect of the flow of electric current through the cell, liberating CL (chlorine) at the zinc anode (negative pole) and NH_4 (nitrogen and hydrogen) at the carbon cathode (positive pole). The following reactions occur:

The E. M. F. generated in the dry cell is due to the chemical action of the ammonium chloride upon the zinc anode. The greater the difference in intensity of chemical action, the greater the difference of E. M. F., and the greater the value of the current output.

When a dry cell is in action, the positive element becomes covered with bubbles of hydrogen gas, which is a poor conductor of electricity and tends to decrease the current output of the cell. To prevent these bubbles from interfering with electric current generation, some means must be provided for disposing of the gas.

In dry cells the hydrogen gas that causes polarization is combined with oxygen gas evolved by the depolarizing medium. The combination of these two gases produces water which does not hinder the action of the cell but helps keep the interior moist.

"It's Lucky We Kept our Telephone"

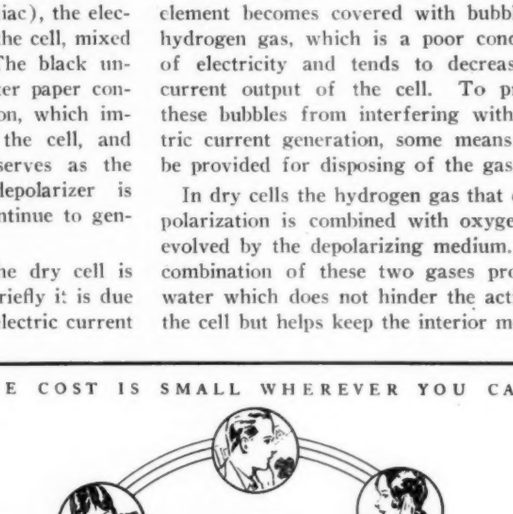
. . . Said Jim as he hung up the receiver, "or I'd still be out of a job. Just had a call to report for work in the morning."

The other side of the picture: a contractor needed men in a hurry . . . "get them by telephone — it's the easiest and quickest way" . . . the natural order from a modern business man with no time to hunt those out of reach.

With a telephone in your home you are always within instant reach . . . . . The cost is small. So little, in fact, that it really doesn't pay to try to do without it.

SOUTHERN BELL Telephone and Telegraph Co. INCORPORATED

THE COST IS SMALL WHEREVER YOU CALL



Let the Telephone Keep Your Circle Together

When friends have moved to other cities, children are away at school or you are many miles from the folks back home . . . . remember you can bring them to you easily and quickly by telephone.

Next best to seeing friends and relatives is talking with them. Even when they are miles away you can telephone them at small cost.

Out-of-town telephoning costs less than most people imagine. For example, the station-to-station day rate to a point 125 miles away is about 75 cents. If you call during the night period, the rate is much lower.

SOUTHERN BELL TELEPHONE AND TELEGRAPH CO. (INCORPORATED)

Reproductions of Two Advertisements of the Southern Bell Telephone & Telegraph Co. These Appeared During January in Various Newspapers Having a Combined Circulation of from 700,000 to More Than 3,000,000.

Two kinds of chemical action are to be distinguished in a dry cell: (1) The chemical action which depends on the flow of electric current, and does not take place when there is no current; and (2) the chemical action which is independent of the flow of current, and which takes place whether the current is flowing or not.

The chemical action which depends on the current is proportional to the current. It is essential to the operation of the dry cell as a generator of electric current; its energy is available for the maintenance of the current, and it is called voltaic action.

The chemical action in a dry cell, which is independent of the current, represents absolute waste of materials, and it is called local action. Local action takes place more or less in every type of dry cell. When chemically pure zinc forms the containing vessel of a dry cell, there is no action at the zinc except when the cell is supplying electric current in a circuit.

Owing to chemically pure zinc being very expensive it is not generally used in the manufacture of dry cells commonly employed in telephone practice. Ordinary commercial sheet zinc is used instead. Ordinary commercial zinc contains many impurities, such as particles of iron, carbon, lead, tin, etc., and when such zinc is used as part of a dry cell, these impure (foreign) particles form numerous minute local cells on the surface of the zinc inside the principal cell, with the result that the zinc is slowly but continuously eaten away, whether the cell is in action or at rest.

Local action is prevented by thoroughly amalgamating the zinc with mercury. A bright amalgam (a metallic mixture or alloy of which mercury is the chief constituent) is formed over the surface of the zinc and it is said to be amalgamated.

Sheet zinc for dry cell containers is sometimes made with a small amount of mercury in its composition. The mercury does not prevent the zinc from being dissolved during the action of the cell when it is delivering current to a P. B. X. switchboard, but continues to re-form an amalgam as the zinc wastes away.

One of the disadvantages of dry cells when used in P. B. X. practice, is that of the chemical action, deterioration and waste of material by oxidization.

Dry cells are usually proportioned so that the electrolyte and depolarizing materials become weaker as the zinc is consumed. When the cell finally becomes exhausted it is not profitable to attempt to recharge it because new cells can be obtained at a lower cost.

Library for Telephone Employes in San Francisco, Calif.

An extensive library for the use of employes of the Pacific Telephone & Telegraph Co. is maintained on the 26th floor of the company's headquarters building in San Francisco, Calif. Reading tables have been provided and all employes are at liberty to go there between the hours of 9 a. m. to 5 p. m. daily except on Saturdays when the library is closed at noon.

All books, except reference works and certain rare volumes, may be taken from the library the same as from any public or circulating library. This library is not merely a repository of books; the library force is ready at all times to assist in locating information regardless of its source. The library consists of approximately 800 volumes, hundreds of pamphlets, communication reports, and telephone directories.

Employes' Library in Pacific Telephone & Telegraph Building in San Francisco, Calif.

There is practically a complete file of all the American Telephone & Telegraph Co. pamphlets, Bell Laboratories and Western Electric reprints. On the periodical rack there are magazines covering the subjects of electricity, communication, mechanics, business statistics, technical research, accident prevention, architecture, health and hygiene, public relations and automatic machinery.

Any government information of value to the telephone company is contained in the library, and also the magazines of the Associated Bell companies in the United States and Canada. The library is a subscriber to a number of research bureaus. Through individuals in the organization the organization is a member of several technical societies, from all of which the library is receiving reports and periodicals.

A number of interested officials and employes of the company have donated valuable books to the library.

National Safety Contest Among Commercial Vehicle Drivers.

A new kind of automobile race, in which safety instead of speed will be the determining factor among 400,000 commercial vehicle drivers, started on a country-wide basis on January 1, under the auspices of the National Safety Council, Chicago, Ill. This big fleet safety contest will continue for a six months' period during which time it is estimated that the total mileage traveled will run close around the two-billion-mile mark.

Vehicle operators in commercial, transportation and industrial lines in every state in the union, representing approximately 1,000 member fleet operating organizations, were on their way at the crack of the starting gun. The best fleet no-accident driving records are to be fittingly rewarded in each of the various groups at the 21st Annual Safety Congress this fall.

Sixteen divisions have been made among members of the delivery, taxicab and bus section of the council according to the business engaged in. Two prizes are to be awarded in each division, one to the larger and the other to the smaller fleet making the best no-accident record during half year period.

The principal divisions are: Bakeries; building supplies; buses; laundries and dry cleaners; coal and ice; ice cream; dairy products; department and furniture stores; wholesale merchandise fleets such as groceries, meats, etc.; retail companies of the same type; newspaper delivery; oil and gasoline; public utilities; taxicabs; transfer; cartage and storage; general industrial fleets; and miscellaneous groups.

Vehicles eligible may be either gasoline, electric or horse-drawn. They must be in regular service and must be owned by the company.

The contest will close June 30, 1932. The winners of each group shall be the units having the lowest number of accidents per 100,000 vehicle miles (or vehicle hours as the case may be). A majority vote in each division shall decide whether the records are to be appraised on a vehicle mile or a vehicle hour basis.

Prices in the Metal Markets.

New York, January 25: Copper—Quiet; electrolytic spot and future, 7¼@7½c. Tin—Steady; spot and nearby, $21.87; future, $22.12. Lead—Steady; spot New York, 3.75c; East St. Louis, 3.55c. Zinc—Steady; East St. Louis spot and future, 3.00c. Antimony—6.00c.

Personal Notes from the Field

Harry N. Faris, of Abilene, Kans., telephone consultant and technical engineer of the United Telephone Co., who was taken suddenly ill in Oklahoma City, Okla., on December 28 en route for a vacation at San Antonio, Texas, has shown some improvement. He recently left the hospital and is now at the home of his brother-in-law, J. H. Wilkins, 1425 East 18th street, Oklahoma City. His many friends in the field wish him a speedy recovery.

Herbert F. McCulla, Lincoln, Neb., assistant commercial superintendent of the Lincoln Telephone & Telegraph Co., has been honored by being awarded the 1932 distinguished service medal by the Lincoln junior chamber of commerce. Mr. McCulla was formerly national president of the junior chamber of commerce, head of the local chamber and active in civic affairs of both major and minor importance.

In conferring the medal upon him, President Robert E. Van Pelt said that Mr. McCulla richly deserved the honor because of "the time he devoted as president of the United States Junior Chamber of Commerce and because he has been extremely active in civic affairs in Lincoln, helping to direct two successful campaigns—one for increasing the general financial budget required by the city council in order to properly care for municipal activities, and the other for the voting of bonds for an extension of the city water system that will give it a permanent supply.

"He has taken an active part in promoting and maintaining the Lincoln Symphony Orchestra and has been helpful in community chest campaigns and other public affairs."

Formal award of the medal will be made at a dinner to be given in February at a time when National President George Olmstead, of Des Moines, Iowa, will be able to be present. It will be made a community event. Members of the committee that made the award were Mayor Zehrung; President John H. Agee and Secretary Walter S. Whitten of the Lincoln Chamber of Commerce; R. M. J. Joyce, H. W. Moble, R. E. Campbell and Archie Furr, heads of other civic bodies.

C. L. Ovitt, Enosburg Falls, Vt., for years president of the Northern Telephone Co., retired from the telephone business on December 1 at which time the stockholders of the company transferred their holdings to the New England Telephone & Telegraph Co. He was responsible for the installation of the first telephone line in Enosburg in 1883, and is given credit for a great part in the development of the telephone industry in northern Vermont.

The Northern Telephone Co. was organized in 1898 and in that year Mr. Ovitt negotiated with the New England Telephone & Telegraph Co. the first connecting company traffic agreement effective in Vermont. In 1906 the Northern company constructed a central office building in Enosburg Falls which was the first telephone building in the state.

Mr. Ovitt, starting with a single wire line and two telephones in 1883, has promoted the growth of the Citizens Telephone Co. to 2,000 stations, the Central Telephone Co. to 1,700, and the Northern Telephone Co. to 1,700.

He was secretary and treasurer of the Vermont Telephone Association from 1920 to 1930 and during that time became well known to telephone men in Vermont. He was responsible, to a large extent, for building it up to its present state of importance to the Vermont companies. He is a member of the United States Independent Telephone Association and of the Independent Pioneer Telephone Association of the United States. He has attended a number of the national Independent conventions in Chicago.

C. L. Pickett, who has been local manager of the Northwestern Bell Telephone Co. at Norfolk, Neb., for the past 14 years, has been transferred to Wayne, Neb. From that point he will supervise the South Sioux City area which comprises exchanges at South Sioux City, Dakota City, Homer and Wayne. He has been succeeded at Norfolk by Charles P. Cunningham, formerly at Sidney, Neb.

Obituary.

George W. Dorrel, of Hope, Ind., principal owner of the Hope Telephone Co. and a director of the Hope State Bank, passed away at his home recently, following a heart attack, at the age of 72 years. He was a well known Indiana telephone man.

Mr. Dorrel was born in Ohio county, Indiana, where he spent his early life. He became a resident of Hope in 1913 and later took over a controlling interest in the Hope Telephone Co., which included the exchanges there and in Hartsville.

Several years ago he bought the St. Paul and Flatrock Cave telephone systems, later combining the latter system with the Lewis Creek system. He owned and operated those exchanges until his death.

He was a member of the Masonic, Knights of Pythias and Modern Woodmen orders. The survivors are his mother, Mrs. Polly Dorrel, of Rising Sun; his wife, two daughters and two sons.

John J. Kelley, auditor of receipts of the Illinois Bell Telephone Co., Chicago, died January 4 at the Highland Park Hospital, Highland Park, Ill., following an illness of several months due to heart disease. Mr. Kelley was 62 years old.

Born in Grafton, Mass., September 26, 1869, Mr. Kelley began his telephone career with the Chicago Telephone Co. in 1902 as assistant chief clerk to Auditor J. W. Richards. In 1909 he was made chief clerk in the revenue division, and

The Late John J. Kelley, Auditor of Receipts of the Illinois Bell Telephone Co., Was for 30 Years in the Auditing Department of It and Predecessor Companies.

from 1911 to 1920 he was chief traveling auditor of the central group of Bell telephone companies.

In 1920, Mr. Kelley was appointed auditor of receipts of the central group of Bell telephone companies, and when a separate organization was established for the Wisconsin Telephone Co. in 1922 he continued as auditor of receipts for the Illinois Bell Telephone Co., which position he held at the time of his death.

He became a member of the Telephone Pioneers of America, Theodore N. Vail Chapter No. 1, in 1923, and was a member of the Chicago Association of Commerce and the Traffic Club.

As chief traveling auditor, Mr. Kelley was held in particular esteem for his ability to protect the company's interests. In the period when he was auditor of receipts, reporting to the general auditor, many major changes in the accounting work were made; such as the centralization of revenue accounting work for the suburban division, the introduction of the stub method of keeping subscribers' accounts, the adoption of the rotation plan of billing, and the preparation of bills by machine.

Mr. Kelley is survived by his widow and three children, Robert and Annette of Wilmette, Ill., and Mrs. Eleanor K. Weyl of Swampscott, Mass.

What the Commissions Are Doing

Up-to-the-Minute News Regarding the Activities of State and Interstate Commissions, Courts and City Councils in Matters Concerning Telephone Companies—Summary of Commission Orders and Schedule of Telephone Hearings

Commission Urges Coordination of Service Around Los Angeles.

The California Railroad Commission has issued an order denying the application of a group of 35 subscribers of the Southern California Telephone Co., asking that the territory between the eastern boundary of the city of Los Angeles and the western city limits of Montebello be transferred from the Montebello telephone exchange to the Los Angeles exchange area.

In denying the request of the applicants for the proposed exchange, the commission in its decision declares that "the telephone companies which furnish service in and about Los Angeles should energetically prosecute a study of the telephone situation which exists there at this time and reach a determination as to the best coordinated plan of general service which may be inaugurated with reasonable dispatch.

Only in this way may future expenditures of money in the Los Angeles terrritory result in the greatest benefit to the public and to the utilities.

Senate Asks for All Data on Radio Monopoly Suit.

U. S. Attorney General Mitchell was requested on January 22, in a resolution offered by Senator Blaine and adopted by the Senate, to withhold action on the suit in Delaware against the Radio Corp. of America and others until the Senate judiciary committee can obtain the facts in the case.

Other corporations named in the original bill of complaint include the American Telephone & Telegraph Co., the Westinghouse Electric & Manufacturing Co., the General Motors Corp., and the General Electric Co.

The resolution requests the Attorney General to report the status of "any negotiations or conferences which may have taken place between the representatives of the government and the said defendants," and asks him "not to compromise or settle" the suit, or permit the entry of a consent decree "until the judiciary committee of the Senate has received the information and advices requested herein, to the end that legislation may be initiated for the protection of the public's interests and the safeguarding of the radio industry, if necessary."

Prosecution of the case has been held up by the Department of Justice for some months, pending the result of negotiations to end an alleged monopoly in radio patents held by the various corporations.

Conferences were held last spring with officials of the Department of Justice by Owen D. Young of the General Electric Co., David Sarnoff of the Radio Corp. of America and others. On September 26 these conferences were resumed in New York City and have been continued, off and on, until the present.

It is understood many differences have been composed. It is possible, it was stated last week, that an agreement can be reached on the matters yet in dispute, but that another part of the controversy may have to be taken into the courts.

Time Extended for Appeal to Federal Supreme Court.

The time limit for an appeal to the United States Supreme Court in the so-called New York Telephone Co. case has been extended by the order of the court until May 15 next. Several prior extensions have been obtained, the decision of the lower court having been handed down on November 11, 1929.

In this case, the District Court of the United States for the Southern District of New York held that orders of the New York Public Service Commission prescribing maximum rates, toll charges and rentals for telephone services by the New York Telephone Co., both in New York City and throughout the state, were confiscatory of the company's property.

Brief on the Interstate Commerce Commission's Power Over Radio.

The Interstate Commerce Commission has jurisdiction under existing law to regulate charges made by radio broadcasting companies for the "transmission of intelligence for hire by wire or wireless," according to a brief filed with the commission January 16 by the Sta-Shine Products Co. of Freeport, L. I., N. Y., in support of its complaint against the National Broadcasting Co. and Station WGBB, Freeport.

The defendant radio concerns, in reply to the complaint of the Freeport furniture polish manufacturing firm, asserted that they were not "common carriers" under the meaning of the interstate commerce act and therefore not subject to the act nor to the commission's jurisdiction. The commission was asked to dismiss the complaint.

The complainant company charged that the radio concerns violated certain provisions of the act by charging "unreasonable" rates for the transmission of "messages" for hire in interstate commerce.

It was alleged in the complaint that the charge for sending the "messages" over a single station was in excess of $100 and for so-called "chain transmission" exceeded $1,000. It was further charged that discrimination was practiced by the National Broadcasting Co. in refusing to provide "facilities" to the Sta-Shine company while providing them for others.

The National Broadcasting Co. and Station WGBB of Freeport, L. I., N. Y., on January 18 filed a joint reply to the complaint and brief of the Sta-Shine company.

The brief denied that the radio companies are "common carriers" within the meaning of the interstate commerce act, and asserted that they do not engage in the "transmission of intelligence by wire or wireless" as charged by the furniture polish manufacturing concern.

It was pointed out that the act was written before the advent of "broadcasting" and that "transmission of intelligence" referred to the sending of messages from one individual to another, and not from an individual to all those who have receiving sets to tune in on a broadcast.

It was further asserted that a common carrier is defined as a carrier which transports all property, etc., brought to it by the public, whereas the broadcasting companies, under the radio act, must use discrimination in the choice of the material presented for broadcasting in order to insure its being in the interest of the public. The commission was asked to dismiss the complaint.

San Antonio, Texas, Rate Case Rehearing Closed January 23.

The rehearing of the suit of the Southwestern Bell Telephone Co. against the city of San Antonio, Texas, closed on January 23, with the entry by Bruce W. Teagarden, assistant counsel for the city, of a long list of objections to the company's exhibits and testimony. Several new witnesses were introduced during the final week.

The case now rests with Judge Joseph B. Dibbrell, special master in chancery, who will make his report to the federal district court as to whether the city's rate-regulating ordinance should be set aside and the company allowed its 1928 rate increase, or whether the city should be enabled to control the rates.

The use of exchange plant for toll purposes is one of the city's chief points, and took up much of the discussion during the week. On January 18, J. G. Wray, Chicago, rate expert, was on the stand the entire day and read from a number of exhibits which summed up his findings in detail. He was questioned by Carl Wright John-

son and Mr. Teagarden, attorneys for the city, and E. W. Clausen, chief counsel for the telephone company.

The city attempted to show, through Mr. Wray, that the telephone rates in effect before the increase of from 20 to 33⅓ per cent, which the city council refused to sanction in 1928, will produce a fair return on the investment when local and toll charges are adjusted properly.

Testimony brought out was to the effect that while the local exchange passes on to subscribers a big part of the cost of toll service, no part of the profit derived from toll calls is permitted to be credited to local exchange revenues.

Mr. Wray expressed the opinion that the toll service is more valuable to the company than the local exchange service and therefore, he said, the toll service should bear the greater part of the operating cost. He testified that the earnings from the company's toll business, on the "board basis" were "very large," which statement was objected to by the company attorneys. However, the master ruled that if Mr. Wray knew, he might answer the question.

Clinton H. Montgomery, employed by the city in the first hearing to prepare exhibits on accounting matters affecting the Southwestern Bell company's business, was placed on the stand January 19.

The only cross-examination by Mr. Clausen was to ask the witness if he had repudiated the theories and principles that he stood for in the first hearing.

In the first hearing Mr. Montgomery's exhibits were on the board-to-board theory of telephone plant operation, and in this hearing he entered exhibits on the station-to-station theory. Mr. Montgomery declared that he had made the station-to-station exhibits on Mr. Wray's request.

Mr. Clausen insisted that in making the exhibits on a different theory, the witness had repudiated his first exhibits. Mr. Montgomery contended that the basic principles of auditing were the same in each set of exhibits.

"I am asking you," said Mr. Clausen, "whether you subscribe to the same accounting methods and principles used in 1928?" and Mr. Montgomery replied:

"As a general proposition I would say that I find nothing in the principles that I used, that I would depart from."

On January 20, C. W. Fenstermaker, real estate man, testified concerning real estate values of the company, and J. H. Frost testified in regard to income that would be desired on investments such as telephone company stock.

Mr. Fenstermaker valued the location of the Crockett-Travis exchange building at $2,250 a front foot, for the 113-foot frontage. This valuation, a total of $254,250, was of 1927, he said, and declined later to $2,000 a front foot, or a total of $226,000.

The first question asked Mr. Frost by Carl Wright Johnson, leading counsel for the city, made almost two pages of typewritten copy, as Mr. Johnson laid the premise for expected return on the investment in question.

He spoke of the Southwestern Bell Telephone Co. as a going concern, with years of experience and with the backing of American Telephone & Telegraph Co., a billion-dollar corporation with about five billions in resources.

He then asked Mr. Frost what rate of interest would be expected on an investment in the stock of a company of that character and standing.

Mr. Frost said that a return of 6 to 7 per cent would be considered satisfactory.

The hearing then adjourned until January 22, when R. H. Gregory, New York, comptroller of the Western Electric Co., appeared on the stand, to answer questions during the city's presentation of its case on inter-company relations.

F. J. Brandle, general inventory and cost engineer of the Southwestern company, and Harry Fritz, general protection and transmission engineer, were placed upon the stand for the first time on January 23.

The hearing closed with the entry by Mr. Teagarden of the city's objections to the company's exhibits and testimony W. P. Clark, auditor of the company, bore the brunt of the voluminous objections. Mr. Teagarden charged that Mr. Clark's exhibits on toll and exchange revenues and expense were contrary to the law of the court of re-reference and to the supreme court's findings in the Illinois telephone case.

Exhibits and testimony of Howard S. Snell, inventory and cost engineer for the company in Texas, were objected to on the ground that Western Electric Co. prices were used in the set-up.

Mr. Teagarden also objected to the depreciation figures of W. J. Manion, now with the A. T. & T. Co. in New York, and to the going concern value of the San Antonio telephone plant.

After closing, Master Dibrell and representatives of both sides of the controversy inspected the physical plant of Crockett-Travis exchange. The purpose of the plant tour was to "add light to the situation," and to clarify controversy between Mr. Wray and Mr. Brandle.

Whatever Master Dibrell's report, the losing side is expected to file exceptions in the form of briefs. Judge Edwin Holmes of Mississippi is again expected to hear the exceptions, as he did before the case was re-referred.

Answers to Traffic Questions Presented on Page 23.

1. If the TTC operator says "All trunks busy," understand that the ringdown trunks from the terminating toll center to the called place or terminating ringdown office are busy and leave a call order, saying: "Call operator—(number of proper point-to-point position) at—(name of your office, called place, called number or address name), all trunks busy. I will hold this circuit." Proceed thereafter in accordance with the instruction for handling a report of *BY* from a built-up circuit point, except that you give reports of *NC* instead of *BY*.
2. It is the operator's responsibility to notify the calling party when his initial period is up on all calls originating at a pay station regardless of whether or not this information is requested by the calling party.
3. We do use a "split" connection on a local pay station call. When the called station answers on a trunk connection, verify the called number. If it is the correct number, say, "One moment, please?" Then establish connection and request the deposit in the hearing of both parties.

   It is not necessary to verify the called number on a local multiple connection. When the called station answers, say, "One moment, please?" Establish the connection and request the deposit in the hearing of both parties.
4. It is not considered the operator's error if a subscriber hangs up after being asked to hold the line.
5. The toll operator announces a call and verifies the station reached in the following cases:
   (1) A station-to-station call on which the calling party is not holding the line.
   (2) A person-to-person call on which the calling party is not holding the line.
   (3) A person-to-person call on which the calling party is holding the line but conversation does not start immediately and you are not sure that the person answering the telephone is the called party.

Farmer-Owned Nebraska Company Reduces Rates; Has Surplus.

The first telephone company in Nebraska to cut rates is the Glenwood Telephone Co., which asked and secured permission of the Nebraska State Railway Commission to reduce rates 25 cents a month to patrons of its Blue Hill exchange. No changes are made at any other of its exchanges.

The Glenwood company is a combination of farmer-owned telephone companies operating in south central Nebraska. It is not operated for profit, and declares no dividends. It lost $800 a year in operation during the last year, including a small charge of $500 for depreciation, and has $1,319 in unpaid rentals.

The management reported that it had a surplus of $2,081, and that this would be drawn upon to maintain the plant and pay operating expenses for the year. As the

stock is all held by farmers, the effect of the reduction is that the farmers are taking out of one pocket money with which to pay the deficit in another pocket resulting from reducing rentals.

Under the provisions of the order the present net rates will become the gross rates for the future. Those who pay during the first 30 days of each six months' period during the year will be given a reduction of 25 cents from the gross tariffs. The company charges $1.65 for rural service, gross rate, where a renter is served, and 25 cents a month less where the subscriber is a stockholder. Business rates were $2.00 a month for renters and residence $1.85, with 25 cents deducted for stockholder patrons.

Denied Permission to Close Exchange; New Schedule Granted.

The Smithfield Mutual Telephone Co., after being denied permission by the Nebraska State Railway Commission to close its exchange for a time in order to impress upon subscribers the necessity of keeping it open all the time by paying their rentals, has been granted authority by that body to put into effect a gross and net schedule of rates. This has been successful in the past with other companies as a means of securing prompt payment of rentals, the saving of 25 cents a month being a big inducement to most farmers.

The order permits the company to charge $1.00 a month for all classes of service where the subscriber does not pay in advance by the 10th of the current month, and to charge 75 cents where such payment is made. The company has been authorized to take whatever steps its officers deem necessary to force the delinquents, a third of its total subscribers, to pay up back dues, and to cut them off without further notice if they do not promptly meet their obligations.

The company is a farm mutual organization that has come under the corporation laws because it has been selling service to a few farmers who are not stockholders, and has been losing money. Because subscribers own their own lines the rate has been only 75 cents a month. The company has 167 subscribers, of which 57 owe two years' rental, it is claimed.

Merger of 12 Separate Wisconsin Companies Authorized.

The Public Service Commission of Wisconsin has given Commonwealth Telephone Co., Wisconsin operating unit of Associated Telephone Utilities System, permission to acquire 12 separate operating companies.

The Lac du Flambeau Telephone Co., Marquette Telephone Co., Nichols Telephone Co., Sayner Telephone Co., Three Lakes Telephone Co., Adams County Metallic Telephone Co., Bingham Telephone Co., Delton Telephone Co., Freeman Telephone Co., Friendship Telephone Co., Holton Telephone Co., and Wise Telephone Co. of Birchwood are companies included in the authorization.

These acquisitions constitute a further step in the Associated Telephone Utilities Co.'s program of consolidation of operating properties within each state area into compact operating units, thus obtaining benefit from economies possible under unified operation.

Summary of Commission Rulings and Schedule of Hearings.

INTERSTATE COMMERCE COMMISSION.

January 7: Order issued approving the acquisition by the Bell Telephone Co. of Pennsylvania of the properties of the Clinton Telephone Co., operating in portions of Lycoming and Clinton counties, Pa.

CALIFORNIA.

June 18: Order issued denying application of a group of 35 users under the Southern California Telephone Co.'s system, asking that the territory between the eastern boundary of the city of Los Angeles and the western city limits of Montebello be transferred from the Montebello exchange and be made a part of the Los Angeles exchange area.

ILLINOIS.

January 6: Order approved dismissing complaint of the Canterbury Court Apartment Hotel against the Illinois Bell Telephone Co. as to rental and installation charges in the hotel of complainant in Chicago.

January 6: Forreston Mutual Telephone Co. I. C. C. 2, filed, sheet 4 Forreston, sheet 2 German Valley, contains a rule providing for a penalty of 25 cents per month for failure to pay by the 15th of the month following rendition of bills, effective March 1.

January 6: Smiley Brothers Telephone Exchange I. C. C. 1, filed covering service connection, and move and change charges applicable to service in O'Fallon, effective February 1.

January 6: Bond County Telephone & Telegraph Co. I. C. C. 1, original sheets 1 to 9, covering service connection, and move and change charges applicable to the Greenville exchange, effective January 27, filed and no action taken.

January 6: Lebanon Telephone Exchange I. C. C. 1, service connection, and move and change charges applicable to the Lebanon exchange, effective February 5, filed and no action taken.

January 7: Special permission granted the Southwestern Bell Telephone Co. to publish, effective January 10, 1932, corrected third revised sheet 1A to rate schedule I. C. C. No. 1 as attached to its application of January 5.

January 7: Illinois Commercial Telephone Co. 2nd revised sheet 1 to I. C. C. 1, applicable to the Capron exchange, containing the gross rates for telephone service with a discount rule which provides for 25 cents per month if bills for exchange service are paid on or before the 15th day of month in which the service is rendered, effective March 1, filed.

January 27: Hearing in Chicago before Commissioner Samuell on complaint of the Illinois Commerce Commission on its own motion vs. the Middle States Telephone Co. to show cause why there should not be a reduction in rates for service in Pekin, Park Ridge, Desplaines and vicinities.

January 27: Hearing in Chicago before Commissioner Gilbert on application of the DeKalb-Ogle Telephone Co. for an order consenting to, approving and authorizing the issue of $164,450 of its common capital stock.

MISSOURI.

February 1: Hearing in Trenton on application of the Middle States Utilities Co. for authority to abandon its Edinburg exchange.

February 1: Hearing in Trenton on application of the Middle States Utilities Co. to serve the telephone subscribrs of its Nettleton exchange through Hamilton.

February 1: Hearing in Trenton on joint application of the Galt Telephone Co. and the Middle States Utilities Co. to abandon their joint telephone exchange at Modena.

February 1: Hearing in Trenton on joint application of the Galt Telephone Co. and the Middle States Utilities Co. to abandon their exchange at Mill Grove.

February 3: Hearing in Hannibal on application of the Middle States Utilities Co. for authority to render telephone service to its subscribers at St. Patrick through its exchanges at Kahoka and Wayland.

NEW YORK.

February 4: Hearing in Lima on commission's own motion to investigate the service and facilities provided by the Rochester Telephone Corp. in the village of Lima, Livingston county.

The investigation was ordered after information had been received to the effect that the Rochester corporation proposes to remove its central office at Lima to the village of Honeoye Falls.

February 10: Hearing in Winthrop on the commission's investigation as to the telephone equipment and service of the Nicholville Home Telephone Co., which operates in part of St. Lawrence county.

The Nicholville Home Telephone Co. is operated by Gordon D. Babcock and has exchanges at Nicholville and Winthrop. The commission decided that an investigation and hearing as to the telephone equipment and service of the Nicholville company should be had after it had conducted an investigation of the equipment and service at the Nicholville and Winthrop exchanges.

OKLAHOMA.

January 21: In regard to complaint of the city of Poteau vs. the Oklahoma-Arkansas Telephone Co. asking for a reduction of telephone rates; the city requested that the case be indefinitely continued. It is reported that during the past two months the commission made a complete audit and appraisal of the company's books and properties, respectively.

PENNSYLVANIA.

January 14: Appeal filed by Howard Slusser, of Hazelton, asking that the Bell Telephone Co. of Pennsylvania be compelled to install a telephone in his place of residence at residence rates, contending that he is in no way connected with the business conducted by his mother, Mrs. William Slusser, on the first floor of the building where the telephone would have to be installed. The company insists he should pay business rates.

TENNESSEE.

January 19: Sale of the local telephone systems at Dyer and Trenton to the Southern Bell Telephone & Telegraph Co. approved. Properties of the Dyer Telephone Co. were sold for $22,000. Although furnishing long distance connections with this system, the Southern Bell has not operated at Dyer heretofore.

The Gibson County Telephone Co., Trenton, sold its properties for $15,000. Its exchange will be consolidated with the Trenton headquarters of Southern Bell.

WISCONSIN.

January 21: Commonwealth Telephone Co. authorized to acquire 12 separate operating companies.

Galva, Ill., Has Central Energy Equipment

New Installation of Equipment Provides Modern Features for Subscribers of the Galva Telephone Co. — The Exchange is Also the Toll Center for Several Other Offices — System Proves Itself in Unusual Kidnapping Situation

By H. T. McCaig,

Assistant Manager, Chicago Office, Stromberg-Carlson Telephone Mfg. Co.

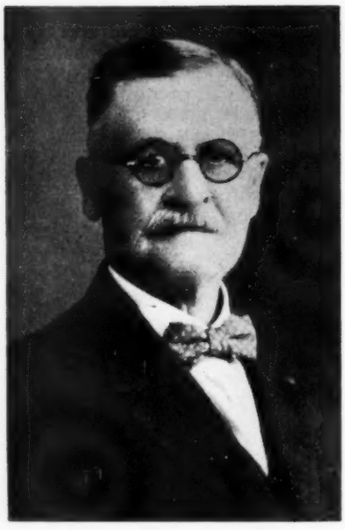
Among the new central office installations made in Illinois during the past year none is more interesting than that completed in the plant of the Galva Telephone Co., Galva. The history of the Galva company is that of a successful, progressive organization whose constant aim has been the satisfactory serving of its community.

In July, 1892, the Galva Telephone Co. was granted papers of incorporation by the state of Illinois. Back of this organization was the desire for more complete and comprehensive service than that then available through operation of the Bell exchange. At that time, it is said, there were 50 Bell telephones serving Galva. The morning after the local telephone company opened up for business, five of these telephones remained in service

At the start the new company had 110 subscribers. From this small beginning the organization and its facilities have grown until now there are more than 800 telephones in the city and something over 200 in rural districts tributary to Galva.

The first board of directors of the company included George D. Palmer, present president of the company; T. H. Johnston, Randolph Boyd, Nels F. Anderson, H. C. Morton, A. E. Bergland and E. E. Fitch.

The first officers were George D. Palmer, president; H. C. Morton, vice-president; T. H. Johnston, secretary, and Randolph Boyd, treasurer. Mr. Palmer has been president for the past 14 years after having been president for the first five years of the company's organization. Alfred Hare was president for a seven-year period and R. F. Beals for seven years. Ralph P. Dexter, secretary and general manager of the company, has occupied that position continuously since January, 1903.



George D. Palmer Has Been President of the Galva (Ill.) Telephone Co. for the Past 14 Years as Well as President for the First Five Years of the Company's Organization.

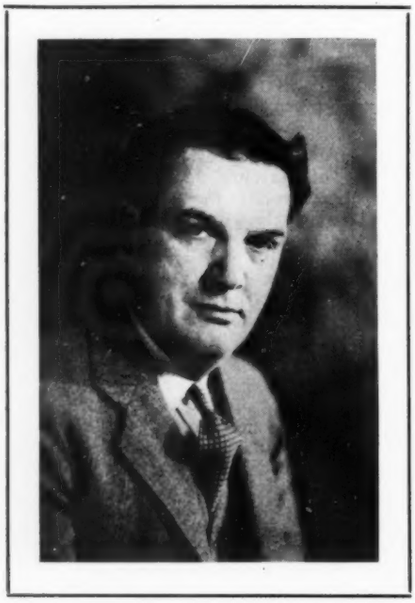
Shortly following the incorporation of the Galva Telephone Co. and in line with plans for its development, W. T. Dickinson was engaged to superintend the construction of the local plant. Seven operators are now employed besides various plant employes.

Following the completion of the original plant, T. D. Nyberg was engaged to be responsible for its maintenance and continued in that capacity for about 19 years.

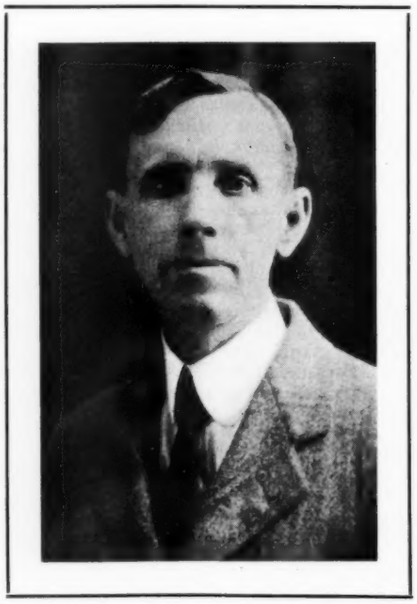
Miss Ethel Farmer, chief operator, has been with the Galva company for 16 years. H. B. Hamline, who recently severed his connection with the company, was in its employ for 13 years. J. T. Brown, who succeeded Mr. Hamline as wire chief, has a service record of 10 years.

Manager Dexter in commenting on the part the employes play in rendering service to the public says: "They work together as one unit to one purpose—service to the public. All of them are ready and willing to work in season and out of season, day or night."

The new Galva installation illustrated in

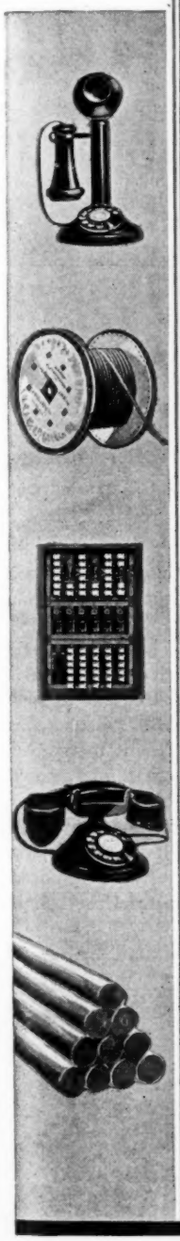


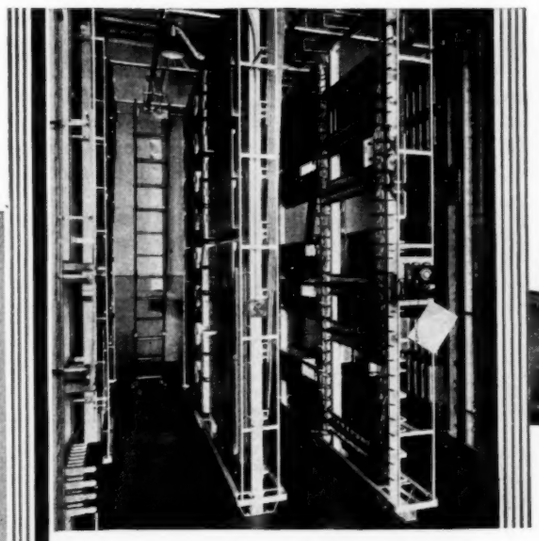
J. T. Browne, Who Recently Succeeded H. B. Hamline as Wire Chief of the Galva (Ill.) Telephone Co., Has a Service Record of 10 Years.



R. P. Dexter, of Galva, Ill., Who Has Been Secretary and General Manager of the Galva Telephone Co. Continuously Since January, 1903.

Miss Ethel Farmer, of Galva, Ill., Chief Operator of the Galva Telephone Co., Has Been with the Company for the Past 16 Years.





JAHU, BRAZIL

The Strowger Automatic equipment here pictured is housed in the beautiful exchange building shown above, which is designed to conform to residential surroundings.

Strowger Automatic Equipment at Jahu, Brazil, Brings Increased Use of Telephone

BETTER service, the executives of the Brazilian Telephone Company have explained, is the cause of Jahu's greatly increased traffic since Strowger Automatic equipment has been installed. In the latter part of 1930, a Strowger Automatic Dial System was cut into service for this city of 30,000 in the heart of Brazil's coffee-growing section. As is always true when antiquated boards are replaced by this perfected equipment, the telephone using public registered its appreciation of the improvement by using the telephone more and increasing the demand for additional connections.

Strowger Automatic equipment is designed and constructed to meet every demand, both present and future, of the community, municipality or territory served. With this equipment the best possible telephone service is provided every hour of the day or night. Future growth is amply provided for by the flexibility of the system, which can be added to as increased demands for service require.

Increased traffic resulting directly from the bettered service shortens the computed time in which this equipment pays for itself. Convincing figures showing the economy of Strowger Automatic equipment in reducing operating costs and increasing revenues are available in any of the offices of this company. Information on Strowger Automatic equipment, as well as on any other item of telephonic equipment, gladly furnished upon request.

SUPPLIERS OF THE FOLLOWING PRODUCTS

•

STROWGER AUTOMATIC TELEPHONE SYSTEMS

MANUAL TELEPHONE EQUIPMENT

ALTON STORAGE BATTERIES

PHILLIPS WIRES AND CABLES

ELECTRICAL MEASURING INSTRUMENTS

DRY BATTERIES

POLES

and other high quality products in the signal and communication field.

AUTOMATIC ELECTRIC SALES COMPANY, LIMITED

Distributors of

Automatic and Manual Telephone Systems—Private Telephone Systems—Telephones

Wires—Cables—Poles—Batteries—Supplies—Etc.

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DISTRIBUTING COMPANIES

Automatic Electric Sales Company, S. A., 22 Rue du Verger, Antwerp, Belgium

In Canada . Independent Sales and Engineering Co., Ltd., Vancouver

In Australasia **• Automatic Telephones Ltd., Sydney**
In Japan **• Automatic Telephones Ltd. of Japan, Tokyo**
In China **• Automatic Telephones of China Federal Inc., U. S. A., Shanghai**
In South Africa **• Automatic Telephones (South Africa) Ltd., Johannesburg**
In Brazil **• Automatic Telephones Ltd., Brazil, Sao Paulo**

ASSOCIATED COMPANIES

Automatic Electric Company, Chicago
Automatic Telephone Manufacturing Co., Ltd., Liverpool
American Electric Company, Chicago
Automatique Electrique de Belgique S. A. Anvers, Antwerp
Eugene F. Phillips Electrical Works, Limited, Montreal
International Automatic Telephone Co., Ltd., London
Associated Electric Laboratories, Inc., Chicago, London, Antwerp
The Alton Battery Company, Limited, Alton, England

the accompanying photographs is one of the latest developments of the Stromberg-Carlson Telephone Mfg. Co. In its operation are involved some of the most modern features of the operator-supervised type of switchboard. Since with the installation of the present equipment a change was made from magneto operation to the feature central energy operation, Galva subscribers observed quite a contrast in their service following the cutover. "Cranking for Central" had passed out of the picture.

Included among time-saving features of the new equipment are automatic listening, machine ringing, flashing recall, secret service and revertive ringing tone. Subscribers responded immediately and most satisfactorily to the inauguration of these new features. They learned quickly to listen for the revertive ringing tone notifying them that the party for whom they called is being rung.

One of the most satisfying features extended to the patrons of the Galva exchange has been improved materially by the installation of the new equipment and the inauguration of operating practices made possible thereby. Galva is a toll center for five other towns—Lafayette, Nekoma, Bishop Hill, Woodhull and Cambridge. Long distance calls over toll lines to and from these points must be handled through Galva. Outgoing calls from Galva and the towns served in this manner total about 1,200 per week, while incoming calls for Galva and such other towns run well over 1,500 calls per week.

As for local traffic, the Galva traffic force feels that it is a dull week that does not call for the handling of well over 20,000 calls. Roughly estimated this is equivalent to one call per day for each man, woman and child in Galva.

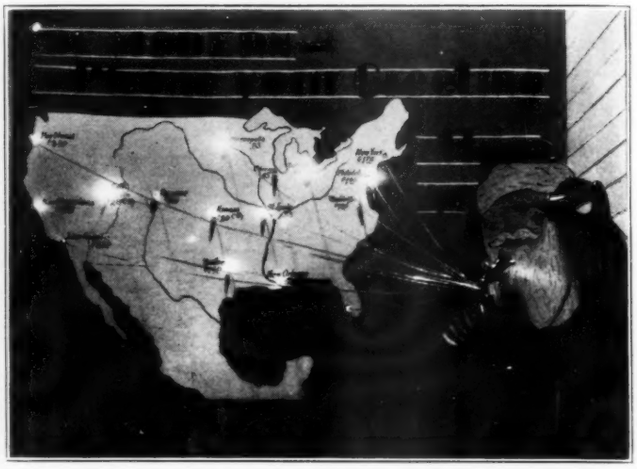
The power equipment, Fig. 1, in the Galva plant has proven decidedly interesting to those who have visited the exchange. Charging circuits are automatically controlled through the medium of an ampere-hour meter and associated apparatus adjusted so that the exchange load is carried almost continuously on the Tungar rectifier charging machine.

In this exchange, which is set up for four-frequency harmonic selective signaling, arrangements are made for the introduction of eight-party selective common battery rural service whenever rural patrons shall be desirous of subscribing to that class of service. This is effected by the installation of reversing jacks in the rural line face equipment so connected to the line circuit that four of the eight subscribers are rung by plugging into one jack and the other four are rung by plugging into the associated jack.

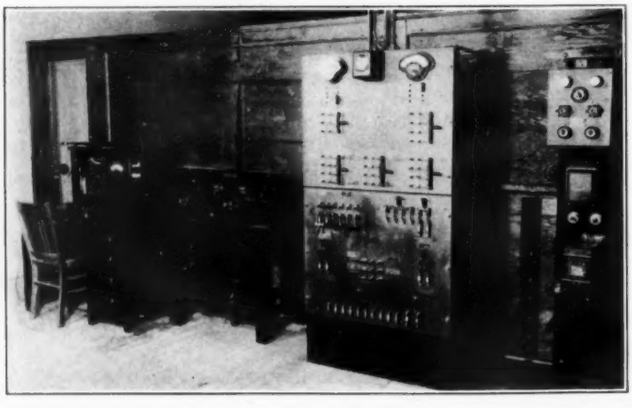
Machine ringing in this plant is tripped instantaneously—that is, ringing current is disconnected from the cord circuit as soon as the receiver of the called telephone is removed from the hook. This method of tripping affords a positive guarantee against the subscriber being rung in the ear. It also relieves the transmitter of the called telephone from the assault of the ringing current should the receiver be removed from the hook during the time the bell is ringing.

As is the case in practically every change is the facility with which a recall can be made. In the past there had been considerable difficulty encountered in making successive calls but with the new equipment this has been entirely overcome.

Toll service to and through the Galva Stromberg-Carlson super-service installation, the cord circuit apparatus is mounted in the terminal room rather than in the rear of the switchboard. In Fig. 2 the terminal room apparatus is illustrated. The rack to the reader's extreme left is that



Two Displays Used by the Galva Telephone Co., Galva, Ill., in Its Office Windows During the Christmas Holidays, Which Carried Out the Idea of Sales Promotion.



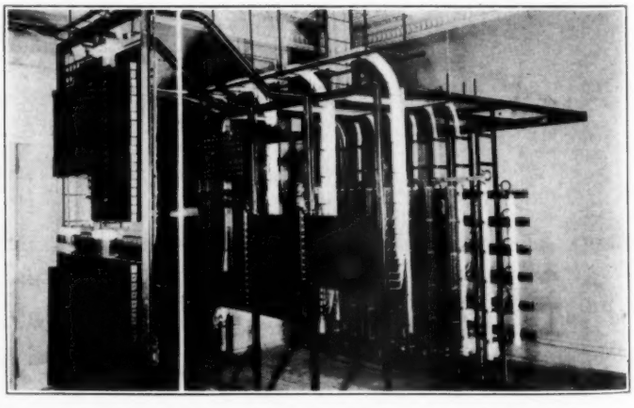
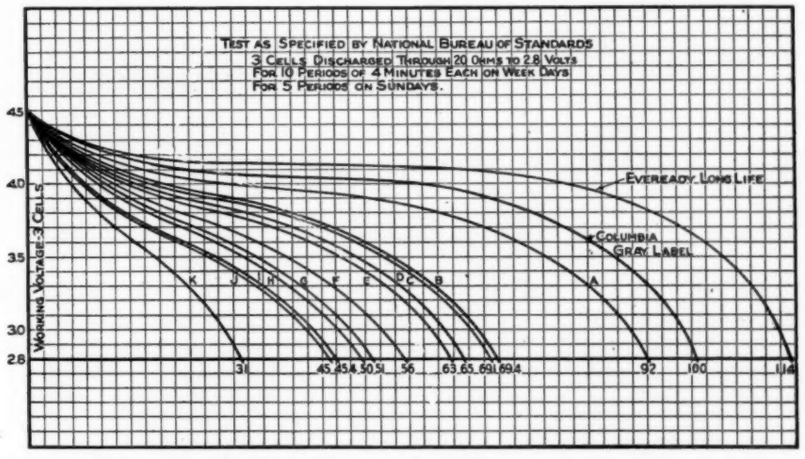


Fig. 1. Power Equipment Installed at Galva, Ill., by the Galva Telephone Co.—Fig. 2. View of Terminal Room in the Galva Exchange.

MEET . . . AN OLD FRIEND IN A NEW TOPPER



Day's life on Standard Light Intermittent Test is expressed in percentages based on Columbia Gray Label as 100%. The Eveready long life Battery shows 114% or plus service, but also carries a higher price.

THIS hale and hearty telephone battery now has another point in its favor — the new metal-seal top, the most important dry-battery improvement in years, patented by the makers of Columbias.

With this new invention, Columbia Gray Label Telephone Batteries are metal enclosed. The metal top is absolutely crack-proof. Together with the rolled sheet zinc that prevents thin spots and leaks, this metal top gives Columbia Batteries *all-armored* construction—preventing undue evaporation and sealing the power in. Ordinary wax seals do not give the same degree of protection.

Thousands of telephone men whose experience has taught them that Columbia Gray Label Telephone Batteries last longer will be interested in this new feature. For it will mean a still more reliable service and even greater battery-economy than Columbias — far in the lead of other telephone batteries by test — have given in the past. If you know Columbias, meet the new metal-seal top. If you've never tried Columbias in your circuit, be sure to specify Columbia Gray Label the next time you put in an order for telephone batteries.

Columbia Telephone Batteries
—they last longer

NATIONAL CARBON COMPANY, INC.
General Offices: **New York, N. Y.**
Branches: **Chicago Kansas City New York San Francisco**
Unit of Union Carbide UCC ***and Carbon Corporation***

occupied by the cord circuit apparatus while in the center of the picture is seen the line and cut-off relays together with the toll and rural line relays. In the background is the main distributing frame.

Fig. 3 shows the Galva super-service switchboard in action. At the time this picture was taken the traffic was light. Shortly thereafter, however, conditions were considerably different as the peak was then well under way.

This switchboard and the associated equipment had a real "baptism of fire" very shortly after the cut-over, when the kidnaping of Earl M. Yocum, Galva banker, took place. For days following the actual kidnaping, traffic continued to surge through the switchboard. Special writers from the metropolitan newspapers arrived in Galva to cover the situation and they, as well as

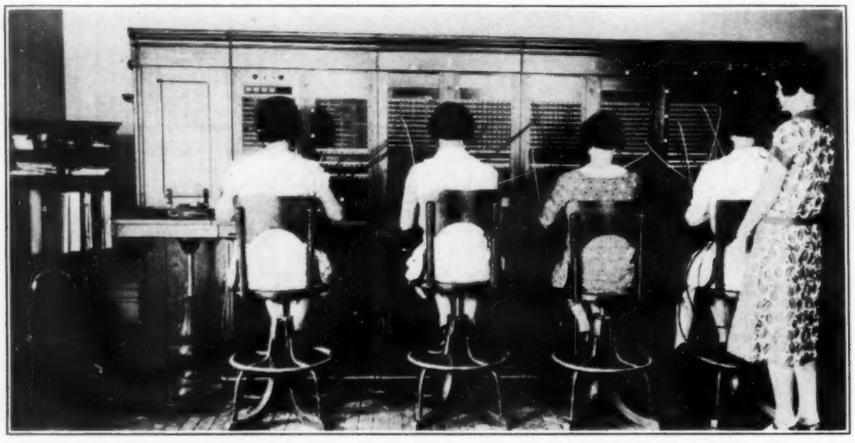


Fig. 3. Stromberg-Carlson Switchboard Installed by the Galva Telephone Co. at Galva, Ill.

others, kept wires hot with stories of the "goings-on" in Galva.

The new and speedy equipment was equal to the occasion, however, and Miss Farmer and Mr. Dexter both praise the equipment which made the successful handling of this overload possible.

The management of the Galva Telephone Co. is justly proud of the new equipment and the service made possible by it. This pride is shared by subscribers of the Galva exchange. Since the cut-over to this new common battery plant in a location prepared especially for it, many telephone men have visited the Galva plant and uniformly have been impressed with the beauty and efficiency of the installation.

Mr. Dexter is a genial host and makes his visitors feel quite at home while inspecting his plant. He is eager to have his visitors see how the wheels go around and either shows them about personally or delegates Wire Chief Brown to take them through the plant.

He feels the telephone company in any community has the opportunity of being a powerful factor in that community's development and is always anxious that other telephone men should see what the Galva company has done, and is doing, to promote the interests of the Galva community.

TIME; DIFFERENT MAN-MADE TIMING DEVICES.

(*Concluded from page 25.*)

elusive idea was finally cornered, history does not relate, but I wonder, as he sat there, if the grunt of the old family hog close by may have drawn his attention. "That darned hog is out again!" he probably exclaimed. As he looked at Grunt's bristling old hide the long sought idea came to him. "Hog bristles!" he exclaimed, as he grabbed tweezers, rushed out, shooed old Grunt back to his sty, cornered him, and in the midst of much squealing, pulled several stiff bristles from his spine.

It really doesn't matter how Doctor Hooke got the idea of hog bristles, or whose hog furnished them. In one of his essays appears this quotation: "A tender, straight spring so affixed that the end thereof plays backward and forward with the balance." Thus the means of applying the pendulum principle to watches—the hair spring was invented in 1661 A. D. by Doctor Hooke.

As my story draws to a close we have a long journey yet between us and the present day. Many, many, wonderful inventions in clock and watch-making have followed one another in rapid succession. But, like Alexander Graham Bell's original telephone invention, they are the original timepiece invention refined and refined, until we wonder: "Isn't this the last word?" Time and its needs will tell.

There was a time when telephone customers were charged for a toll call without much emphasis being placed on the length of time they talked. But in that day telephone transmission was not what it is today so customers often had to repeat, or have Central help get their calls through. They did not care to talk longer than necessary for it was often real work.

It has been said that in a five-minute conversation over the telephone today, the equivalent of half a column in a daily newspaper may be said easily and without repetition.

Today, a minimum charge is made for a certain number of minutes, called the initial period. If customers talk longer than this they are charged for overtime.

The calculagraph clock is the operator's means of checking the time used by customers on long distance conversations.

When conversation starts she slides the ticket into its proper place on the clock, manipulates the start lever, then removes the ticket until conversation ends at which time she re-inserts it and manipulates the finish lever. By this process of stamping the starting and finishing time of conversations on the ticket the operator is able to compute the elapsed time.

In many large cities, such as Chicago, customers who wish the time of day may secure it from Central by depositing a nickel in a coin-box, or having it charged to their station. We may thus credit Alexander Graham Bell with the invention of a timepiece that nets the metropolitan telephone companies thousands of dollars monthly.

As you have traveled with me, in fancy, down the ages to the present day, I have attempted to emphasize, through bits of history, the ever-increasing desire of man to time his performance.

We are now indeed a long way from that misty, remote, past, where folks were just beginning to sense the value of time. And, oh! what an age we are living in today. But let us not forget that we owe much to our pioneer fathers who solved so many difficult problems, thus making life so easy and pleasant for us. Sometimes, I wonder whether our present high-tension, split-second age will produce many such fine men as Galileo, Doctor Hooke, and others, who gave a lifetime to realize the consummation of their dreams.

I stopped in the electric light company's office some time ago and was shown a clock attached to an electric stove which may be set to not only waken you in the morning, but at the same time will turn the current on and start breakfast cooking. Well, this is the last word!—for today.

Joint Meeting in England and Australia Held by Telephone.

On January 14, a group of 14 men in the Board of Trade building, London, England, held a joint meeting with another group in Sydney, Australia.

Walter Runciman, president of the London Board of Trade, with representatives of the British Standards Association, sat at one end of the wire. At the other were representatives of the Standards Association of Australia.

Mr. Runciman spoke of the contribution made to intra-empire trade by the development of standardization in the different parts of the empire. Sir Henry Barraclough, professor of engineering at Sydney University, replied. As the Sydney professor spoke, those in London could hear a paper rustling on his desk, 13,000 miles away.

Theory and Use of Electrical Testing Instruments; Plunger and Polarized Vane Type.

General.

Ammeters and voltmeters, such as are used on automobiles and in connection with radio testing where cheap instruments are desirable, utilize a somewhat different principle of operation than any heretofore described. Such instruments serve merely to give an approximate indication of current or potential conditions in a circuit and should never be used where accurate readings are required.

Polarized Vane Type Ammeters and Voltmeters.

The ammeters used in practically all automobiles are of the polarized vane type. This type instrument is a modified form of the fixed coil-movable magnet type of instrument described in the section on galvanometers. This type instrument consists essentially of a fixed coil (a single turn of large copper wire in ammeters) with a small soft-iron vane attached to an indicator needle and arranged on a pivoted shaft so that the vane normally lies at right angles to the magnetic field set up when current is sent through the coil.

A small fixed position magnet located below the soft-iron vane polarizes it so that when current is passed through the

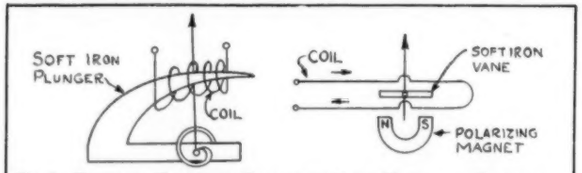


FIG. 1. PLUNGER TYPE AND POLARIZED VANE TYPE OF DIRECT CURRENT METER MOVEMENT.

coil the vane tries to align itself with the flux created in the coil, thus moving the indicator needle over a calibrated scale.

The only difference between ammeters and voltmeters is the number of turns on the fixed coil. Fig. 1 illustrates the arrangement of parts of this type instrument.

Plunger (Solenoid) Type Instruments.

Another form of instrument movement sometimes used in direct current work is the plunger (solenoid) type. This type instrument was devised by Edison and consists of a solenoid coil which is arranged to attract a soft iron core which is pivoted and to which is attached an indicator needle. This principle is utilized chiefly in pocket testers used for testing dry cells.

Unlike the D'Arsonval or polarized vane type movements, the plunger movement will work equally well on either A. C. or D. C.

Both the polarized vane and plunger type instruments are relatively insensitive and are useful only for work where relatively heavy currents can be drawn from the source being measured.

Theory and Use of Electrical Testing Instruments; Alternating Current Instruments.

General.

The common types of alternating current instruments are relatively insensitive, hence are not useful on measurements on high resistance circuits; neither can they be used on currents where the frequency is greater than a few hundred cycles per second. There is, however, a variety of different types of instrument movements which will permit any desired measurement to be made, and it is highly important that the use and limitation of each type be thoroughly understood.

Alternating current instruments may be classified according to type, typical uses and frequency range as follows:

Type of Meter.	Use.	Usual Frequency Range (Cycles).
Dynamometer	Usually used in alternating current wattmeters, and other instruments involving two factors; also used when high accuracy is essential.	0-133
Soft Iron Vane	Most common type of alternating current instrument used in both voltmeters and ammeters. The voltmeters are not suitable on high impedance circuits.	0-133
Induction	This type meter is seldom used except for a few special power applications.	0-133
Hot Wire Type	Measurement of high current values in power work; also used to a small extent in the radio field.	Any frequency in the audio or radio range.
Thermo-couple	Measurement of both low and fairly high currents and voltage in the telephone and radio fields.	Any frequency in the audio or radio range.
Rectifier Type	Measurement of low and medium high potentials, and in some cases low currents on both high and low impedance circuits on telephone and power sources.	0-30,000
Vacuum Tube	Measurement of low potentials on telephone and radio circuits.	Any frequency in the audio or radio range.

Accurate alternating current measurements are more difficult to make than measurements on direct current circuits because of the inherent characteristics of alternating current instruments and the wide range of frequencies encountered in practical work.

Alternating Current Sine Wave Values.

In dealing with alternating currents or potentials there are three ways by which the magnitude of an alternating current wave may be expressed. These are: average value, effective value, and maximum value. These may be defined as follows:

The average value of an alternating current sine wave is equal to the average height of all the ordinates of one-half cycle of the wave.

The effective (sometimes called virtual) value of an alternating current sine wave is equivalent to that of a direct current or voltage which would produce the same heating effect.

The maximum value of an alternating current sine wave is the point of greatest current or voltage which is reached in each half-cycle.

Fig. 1 shows the numerical relation between these three values in a true sine wave.

The question will at once arise as to what voltage will be indicated by a voltmeter or ammeter connected to an alternating current circuit. Obviously an alternating current instrument needle would not indicate the maximum value

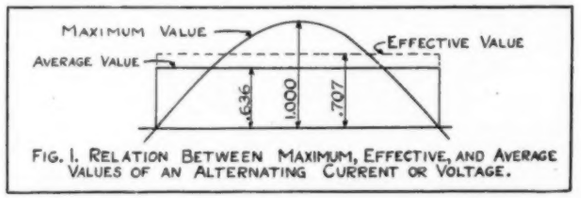


FIG. 1. RELATION BETWEEN MAXIMUM, EFFECTIVE, AND AVERAGE VALUES OF AN ALTERNATING CURRENT OR VOLTAGE.

of the wave, for this value exists only momentarily, and twice during the cycle is actually zero. With frequencies of more than a few cycles per second it is also apparent that the inertia of the indicating needle would not permit it to fall to the zero value during each half-cycle. At first thought it would seem that that needle would indicate the average height of the wave; that is, the "average value."

This is not true, however, as the instrument deflection has been found to be proportional to the "effective value" of the wave. Inasmuch as the "effective value" represents a sine wave which will produce the same heating effect as a direct current of the same value, it is apparent that this would be the correct value to use in dealing with alternating current circuits. Practically all alternating current instruments are, therefore, calibrated to read in effective volts or amperes.

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Notices Previously Published

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16-page booklet illustrating and describing climbers, straps, pads, tool belts and safety straps for linemen. **W. H. Buckingham, 503 State Street, Binghamton, N. Y.**

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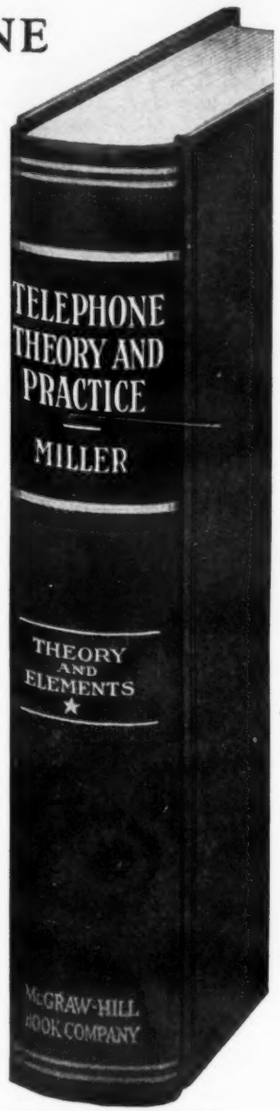
TELEPHONE THEORY and PRACTICE

Theory and Elements

by **Kempster B. Miller**

Fellow, American Institute of Electrical Engineers; Member, Western Society of Engineers; Author of American Telephone Practice, 1904, and Joint Author of Telephony, 1912.



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